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ABSTRACT

This report summarizes activities conducted from fall 1984 through spring 1985, under a planning grant from the Council on Library Resources for Innovation and Improvement of Basic and Supplementary Education for Academic and Research Libraries. The report includes a review of selected literature related to educational programs for academic librarians broadly related to information resources management (IRM); the results of a needs assessment conducted in the state of Oklahoma regarding the appropriateness of a post-Master of Library Science (MLS) certificate program in IRM; and transcripts of the discussion that took place at the fall 1984 colloquium on the topic of IRM at the School of Library Science, University of Oklahoma. Appendices include the IRM Program Survey and the following papers presented at the colloquium: "Information Resources Management and Librarianship" (Evelyn Daniel, School of Information Studies, Syracuse University); "Information Resources Management Skills for Academic and Research Librarians" (Robert Runyon, University of Nebraska at Omaha Libraries); and "Report on the Conference on the Intellectual Foundations for Information Professionals: Criteria for New Educational Programs" (Herbert Achleitner, School of Information Management, Emporia State University). (Author/THC)

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INFORMATION RESOURCES MANAGEMENT SKILLS FOR ACADEMIC LIBRARIANS: FINAL REPORT

For The Council on Library Resources
Innovation and Improvement of Basic and Supplementary
Education for Academic and Research Libraries

By:

Charles R. McClure

With the Assistance of:

Robert Swisher
Kim Granath
Michele McKnelly

University of Oklahoma
School of Library Science
Norman, Oklahoma 73019

March 25, 1985

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INFORMATION RESOURCES MANAGEMENT SKILLS FOR ACADEMIC LIBRARIANS: FINAL REPORT

BACKGROUND

Discussions of the quality of library school programs and what should be done about the future of such programs, are critically important but unfortunately, easily digress into casting blame and finger pointing. Battle lines between practitioners and educators are not productive.

The difficulties and issues to be resolved for improved academic library education are related as much to the profession of librarianship as they are to library education. Further, the success with which we address and resolve these issues will depend on how the profession, as a whole, can determine the types of library education that are necessary and appropriate, the degree to which adequate resources can be made available for that education, and our ability to effectively monitor and evaluate those programs.

Dispelling Myths

A first myth to dispell is that overall, library education is of poor quality and unable to provide leadership or address the profession's future needs. Put in perspective, library education is no better or worse than any other area of librarianship today. As Pat Batten, Director of Columbia University Libraries recently pointed out, only very recently have practitioners shown significant interest in library education (1983). But clearly, the practice of librarianship and the teaching of library/information science are sides of the same coin.

A second myth to dispell is that programs of library/information science education have ignored quality, are not concerned with quality, and do little to insure increased quality. Despite the controversies and problems surrounding COA standards and accreditation, the process does provide an important mechanism for both internal self-diagnostics to improve programs as well as for external accreditation purposes.

Third, the librarian community has sold itself a bill of goods that what we do in society is important, that overall, society recognizes the value for our services, and that we are instrumental for the success of larger societal and institutional goals. Such simply is not the case. In fact, a recent study of the economics of a masters degree in library/information science by Nancy DeWath, a professor at the School of Library and Information Science, University of California Berkeley, has shown that "library education is a poor investment. Current library school graduates can expect to earn less with their MLS degree than the average college graduate" (1984, In Press). Changing library education, alone, will not improve societal norms regarding librarianship.

Related to the myth of value is the myth that there is a "quick fix" that library schools can do something to remedy these and other problems in librarianship. The perennial quick fixes typically suggested include:

- recruit more students from the sciences, management, computer technologies, etc.: this is unrealistic for the reasons that DeWath already has noted; by and large, we are a self selected profession;

- add more information technology courses or otherwise change the curriculum: the pendulum has now returned, some of those schools that rushed into full programs of information management, information whatever, AS FULL BLOWN PROGRAM EMPHASES, are no longer with us;

- make library school faculty go back to the real world to catch up the way things really are: this also makes good press, but first, many library situations are still in the 1950s (as are some library school faculty), being able to do something does not automatically mean that the person can think analytically and there is little reward for either faculty or librarians to establish such relationships; and

- include more practitioners in library science education: role reversals take planning, resources, and reward structures. Librarians infrequently receive "time off" for preparation, adequate financial rewards for teaching, or are able to participate with library school faculty in a collegial atmosphere of idea sharing and discussion that is essential for any effective educator.

These are but a few of the "quick fixes" typically offered. There are no "quick fixes" for improving the quality of library education, as there are no quick fixes for improving the overall quality of our profession.

Recognizing Realities

One reality in library education is that the typical faculty of 7-9 full time professionals cannot be all things for all people. The perspective from the field, is that library schools can specialize at the MLS level to emphasize skills for an area such as academic librarianship. The reality is that most students will take the first job they can get (regardless of setting), that adding courses for graduation makes the library school less competitive vis a vis its neighboring library schools; and even those who promote such approaches cannot agree on specific curriculum content to be included. Specialization is likely to be more appropriate and more effective after the MLS.

Second, a primary role of the MLS is to provide entry level professional librarians and information specialists for a broad range of information-related work environments. Given the fact that there is no undergraduate degree, that students frequently come into programs with little practical experience, and that most programs require only 36 credit hours for completion, specialization at the MLS level is difficult indeed.

A third reality is that library schools have to first and primarily maintain credibility and status within their own institution, and not within the profession. Evidence of this can be clearly seen from the closings of a number of library schools. Their problems had nothing to do with how the profession viewed their programs--Case Western, USC, Denver all had excellent reputations; what they apparently lacked was internal credibility, however defined by that institution.

In short, the bottom line is to be able to facilitate institutional goal accomplishment, demonstrate an ability to perform within the norms of the academy, and not loose too much money in providing library/information science education. Currently, this translates into acceptable student enrollments and high research and scholarly publication activities. Meeting COA accreditation standards did not assist the above mentioned library schools stay afloat.

A reality that needs little mention is the simple fact that by and large, library schools historically have been underfunded and in many instances today, are grossly underfunded. Simply saying that more courses should be offered, better faculty obtained, better equipment, etc. etc. etc. begs the reality of such institutional constraints.

Another reality is that by and large library schools are unable to draw upon practitioners to participate in educational programs: adjunct teaching salaries are minimal given the amount of work necessary to do a credible job; many library administrators do not allow or support librarians to take time from their job and participate as an adjunct or visiting faculty member; state regulations may forbid the individual receiving two checks from different state agencies; the amount of time necessary for a one time "start-up" to teach a course or participate in a lecture is excessive; and finally, those few daring individuals who do take on such extra activities only rarely receive appropriate rewards and encouragement from their host institutions.

Realistically, let us also admit that our profession as a whole has little commitment to ongoing involvement in library/information science education. The degree to which one goes on and obtains advanced degrees, such as second masters, sixth year certificate degrees, doctorates or participate in continuing education programs is, once again, self-determined and not professionally determined. Further, those who need the CE the most are least likely to attend appropriate CE on their own volition.

Unlike the Medical Library Association, for example, or school librarians, for another example, academic librarians have no requirement to return for additional education. A second masters degree or sixth year certificate may not translate into significantly increased salaries, and other encouragements or rewards are rarely provided either by the profession as a whole or the institution to encourage, or demand, such ongoing education.

Finally, many academic library organizations today systematically stifle individual creativity, innovation, the taking on of additional responsibility and are run by library administrators that are out of touch with the day to day realities of their libraries. In a recent study having to do with organizational climates and information processing skills in academic and public libraries, preliminary findings suggest that many library organizations can be best described as tightly controlled, paternalistic (or maternalistic) despotisms (Samuels and McClure, 1983).

Thus, fresh, dynamic, enthusiastic, creative, and hard-working new graduates from library schools have an encounter "of the third kind" upon their first professional position in a library organization. Curriculum changes, in isolation, will not resolve the problem of library organizations that systematically waste and ignore human resources, or otherwise refuse to allow

professional librarians to contribute productively to the overall effectiveness of the library.

Opportunities

Clearly, opportunities are present for updating, innovating, and improving the quality of the curriculum, the faculty, the physical resources, and all of these are both needed and essential for strong educational programs. But these opportunities are tied to larger issues typically related to budgets and the degree to which the library school can obtain institutional support and credibility. What remains to be seen, what remains to be demonstrated, is the degree of commitment in terms of specific resources and proposals, that the profession as a whole is willing to commit on developing strategies to improve and nurture our educational programs.

Given such a commitment from all segments of the profession, recognition that the quality of library education and the profession are inter-twined, communication based on constructive problem solving rather than accusations, and the development of constructive and specific proposals to maintain and improve library education programs, the quality of academic library education programs can be significantly improved and successfully meet the challenges of tomorrow.

COMPETENCIES/CURRICULUM COMPONENTS

In recent years, much has been written about competencies perceived to be necessary for academic librarianship. Regardless of background, i.e., library/information science educator, academic librarian, or academic library director, specific competencies have been identified. Underlying this literature is the assumption, frequently stated but sometimes inferred. that the existing schools of library/information science are only poorly covering the competencies identified.

To obtain a better understanding of the profession's assessment of needed curriculum components in the area of academic librarianship, a literature review concentrating on materials published since 1980 was done. In the literature review, the authors sought out publications that (1) identified specific curriculum components, topics, or activities perceived to be essential for the study of academic librarianship in a graduate degree program, and (2) specific curriculum components, topics, or activities broadly related to information resources management that might be included in a masters degree or post-MLS program in the area of academic librarianship.

Thus, the following is an attempt to summarize selected writings on these topics and provide a listing of detailed competencies, skills, topics, or activities that have been suggested as necessary for an improved graduate program in academic librarianship. Throughout this section the author's own words are used as much as possible to reflect their views accurately. The summaries are listed by the proponent's name for the competencies and the specific competencies included here are taken from the particular publication cited.

Overviews

Lancaster (1984) believes that the major curriculum component for all librarians should emphasize human communication. Other competencies include: entrepreneurial skills, knowledge of computers, and telecommunication networks. He also stresses the importance of having "detailed knowledge of the characteristics of the information sources available through telecommunications networks and in other forms, and how these resources can be exploited most effectively."

Borko's (1984) Projections Concerning Library Information Science Education include:

- Emphasizing the teaching of theory concepts, and principles with less stress on techniques;
- Providing a broad educational foundation to serve as preparation for future learning and career growth and to provide a basis on which the student could move from one institution to another;
- Helping students to develop an attitude of professionalism, an understanding of the aims, goals, and responsibilities of the profession, and an interest in moving the profession forward;
- Providing a more extensive program in continuing education to enable employed librarians and other information professionals to update and upgrade their education; and
- Integrating the use of computers and telecommunication systems and the concepts of information science into such traditional courses as cataloging, reference, and library management while slowly eliminating the distinction between librarianship and information science and creating a unified discipline.

Curricula changes most likely to occur, in his opinion, are those leading to increased emphasis in:

- technical competence
- communication and community services
- new areas of specialization
- practicum or internship training
- research
- teacher training

A useful overview of articles discussing appropriate librarian professional competencies in the area of technology has been edited by Smith (1983). This collection identifies librarian competencies required in specific areas. In networking/cooperation, for instance, Segal (in Smith, 1983, pp. 124-131) notes the need for:

- communication theory and practice
- teaching and training skills
- mastery of the broad field of librarianship
- knowledge of specific systems
- business administration
- planning ability and skills

In the area of technical services, Henderson (in Smith, 1983, pp. 12-42) notes the importance of the following competencies for technical service staff:

- microcomputer applications for bibliographic control
- preservation/conservation skills
- managerial, supervisory and communication competencies
- financial management
- "people" skills

Throughout this volume, emphasis is placed on the importance of knowing both the applications of technologies for library applications as well as administrative techniques to design and implement technologies effectively. This view supports the arguments put forth by Fosdick (1984, p. 301) which stresses the importance of integrating new technologies "across the curriculum."

Academic Librarianship

Battin (1983A) lists the following competencies necessary for academic/research librarians

- First rate mind with problem solving abilities
- Solid undergraduate preparation in any of a variety of disciplines
- Concrete evidence of managerial abilities
- An intellectual commitment to research librarianship.

She also states that research libraries need people who have been trained to question assumptions, collect data, resolve conflicts, make informed judgments, and take decisive action; people who have been taught how to learn in a constantly changing environment; people who understand at all levels the responsibility for financial accountability; individuals who can speak and write well--and with precision--and who can interact effectively with a broad range of scholarly experts.

Battin (Association of Research Libraries, 1982) believes that the Association of Research Libraries (ARL) and Association of American Library Schools, [now Association of Library and Information Science Educators, ALISE] (AALS) should sponsor and develop a series of seminars and workshops focusing on major issues of today, the state of the art in contemporary libraries, and forecasts and trends for the future. Some of these issues include: Collection development in a shrinking economy; preservation; storage technologies; electronic publishing, ranging from on-line table of contents to published material with special data bases and full text information retrieval possibilities; decision making in a technological environment, which involves the whole issue of retrospective conversion; authority files; subject access; economics of information services to scholars; user forecasts and trends for the future; distributive processing; local systems support and central data bases, who does what?; the architecture of information services; personal computers; local area networks; bibliographic services; international scholarly networks and services.

Additional areas brought up in this following Discussion were:

- Changing curriculum to handle new technologies (e.g. optical desk technology)

- Knowledge of a computer language

But overall, three quotes from Battin seem to best summarize her views:

- If we are to develop the kind of talent necessary to assume the awesome responsibility for the management and provision of scholarly information in all its formats in our universities in the year 2000, we must relinquish our long-held notion that one faculty, one curriculum, and one set of admission requirements are adequate for all who share the title librarian.

- I am saying that research librarians, and particularly those with academic status and who hold faculty appointments and so forth, must have a different kind of educational background, because we are operating in an entirely different environment and facing a whole different set of problems. I believe trying to educate everybody within the same curriculum is just not going to work.

- We need people in the profession who have a clear understanding of the professional challenges ahead, who are prepared to make a strong intellectual commitment at the beginning of the graduate program, and who conscientiously and systematically educate themselves for those clearly-perceived responsibilities.

Further, she identifies basic factors that would underlie any successful planning effort for programs to produce professionals prepared to cope with the "real world:"

- The recognition that all libraries and librarians are not alike and that research libraries, by virtue of their size, mission and clientele require a specially designed set of qualifications and rigorous educational preparation

- The recognition that a program of professional education should imply preparation for a life-long career as opposed to a vocational training program which focuses on requirements for entry level positions.

- The recognition that because of a combination of factors, the research library world is a turmoil.

- The recognition that in contrast to most autonomous schools and departments in the university, research libraries are big, labor-intensive organizations, providing services to all components of the host institutions with, as well, local, regional, and national obligations.

Specific competencies desired by Battin (ARL Minutes, 1982) include the following:

- people who have been trained to question assumptions, collect data, resolve conflicts, make informed judgments, and take decisive action

- people who have been taught to learn how to learn in a constantly changing environment

- people who understand at all levels the responsibility for financial accountability.

- individuals who can speak and write well--and with precision--and who can interact effectively with a broad range of scholarly experts

- people who understand and accept their responsibility to identify and analyze the costs of scholarly information services and to take the initiative in devising alternative budget strategies to enable the university to provide the necessary information support for the scholarly community

- people who can make effective long-range plans for the library in a university environment characterized by short-range planning and an anemic inability to set academic priorities

- people who welcome the challenge of re-inventing the research library in the technological environment and who are prepared to take the risks involved in making bold and unprecedented decisions.

Asheim (1983) analyzed 39 openings listed in C&RL News to determine the expressed qualifications needed in the field of academic librarianship.

- Knowledge of computer technology and its application to library operations; often noting OCLC, RUN and MARC.

- supervisory responsibilities

- planning responsibilities

- responsibility for bibliographic instruction

- communication skills
- foreign language competency (5 ads mentioned this competency in relation to a cataloging position, and 5 ads mentioned this competency in relation to a reference position)

Heavy emphasis in these 39 ads was placed on practical skills with some addition of personal qualifications such as--imagination; leadership; capacity to work effectively in a complex organization; demonstrated administrative abilities; ability to adapt procedures; understanding of the mission of higher education; skills in interpersonal relations; ability to represent the department with donors, support groups and rare book community; and ability to provide effective and innovative leadership.

Directors of the ARL member libraries were surveyed by Marchant and Smith (1982) and asked to rank 19 specific competencies concerning academic librarianship with regard to (1) their importance now and in 5 years; (2) their need in different positions; (3) their possession by entry-level librarians; and (4) adequacy of instruction in library schools. These findings were:

Ranking of Competencies: Required of many positions

1. Knowledge of general reference
2. Knowledge of general bibliography

Highly desirable for many positions

3. Human relation skills
4. Analytical skills
5. Knowledge of a foreign language
6. Basic knowledge of library automation
7. On-line retrieval skills
8. Knowledge of specialized reference materials
9. Knowledge of theories of organizing information

Most important skills for some specialist positions

10. Research skills
11. In-depth knowledge of an academic subject
12. Knowledge of library issues
13. Knowledge of collection development theories and practices
14. Supervisory skills

15. Managerial skills

16. Statistical skills

17. System analysis skills

Needed as background for most positions

18. Knowledge of library history

19. Computer programming skills

John Budd (1984) describes the academic librarian as an active participant in the educational process. He believes that they "must work in concert with other members of the community toward fulfilling the university's purpose..., the education of academic librarians should at least approximate that of their colleagues." Specific competencies identified by Budd include:

- the ability to conduct fruitful research in a particular subject area; and
- an intimate knowledge of the purpose of the college or university and a willingness to participate in achieving that purpose.

Although he notes that the types of educational preparation needed by academic librarians depend to a great extent on the nature of the library itself and "the education of academic librarians is also somewhat dependent on the functions that individuals perform within the library," he argues that "What is needed is the revision of library school programs so that they offer graduate education, which includes the availability of detailed functional specialization, the opportunity for in-depth study of the intellectual and practical bases of academic libraries and their environment, and the incorporation of a systems approach to organization, dissemination, and interpretation of knowledge."

Budd differentiates between masters level programs and extended programs and notes "If the extended program is adopted for the educating of academic librarians, it seems that the degree received should be an academic degree rather than a professional one."

Hoadley (1984) lists the following characteristics that are necessary for satisfactory academic librarian job performance:

- the ability to think and reason;
- the ability to interpret and apply cataloging rules to all types of materials;
- research capabilities;
- interpersonal skills including some expectation of what it is like to work;

- ability to function in an automated environment--how to operate equipment and to teach others to use it;
- knowledge of non print media; and
- communication--written and oral.

Academic library directors identified the following areas as those requiring greater emphasis in library schools (Marchant, 1984):

- analytical skills
- statistical skills
- research skills
- managerial skills
- supervisory skills
- systems analysis skills
- familiarity with automation and on-line searching

However, these areas were to be emphasized with "no reductions in traditional bibliographic cataloging, and reference areas have been proposed."

In response to Marchant's essay, Gorman (1984) lists 4 practical steps to improve library education:

- eschew collectively the "information" hearsay;
- understand and define the totality of the profession of librarianship;
- stress the content of librarianship (bibliographic control, reference skills, collection development); and
- integrate schools and working libraries.

Also in response to Marchant's essay, Migneault (1984) suggests the following competencies:

> New graduates who begin their careers in university libraries must be prepared not only to perform the more traditional library functions; they must be prepared to teach, develop and maintain library collections, conduct research and publish their findings, advance the library profession, share in the values of academe, and participate actively in the affairs of the library and the parent institution.

In another response to Marchant, Taylor (1984) lists 5 qualities needed for academic librarians to thrive in a participatory management environment:

- problem-solving ability

- an understanding of the decision-making process
- knowledge of what constitutes a useful plan or recommendation
- willingness to commit time
- willingness to accept responsibility

Specific strategies for how these skills and competencies could be incorporated into a program, however, were not offered.

One of the most extensive attempts to identify competencies needed for academic librarianship is the New Directions In Library and Information Science Education project being completed by King Research, Inc. (1984). Preliminary products from the study include a validation package that lists competencies in areas such as management, skills, activities, and attitudes. Figure 1 is a summary of findings from this study that specifically identify the desired competencies generic across all functions within the academic library setting. The competencies can be best described as "traditional" descriptions of existing activities desirable for library administration as perceived by academic librarians, are skills-oriented, and fail to incorporate many of the information systems or information management competencies identified in other portions of this section.

Information Resources Management

The IRM program developed at the United States Department of Agriculture graduate school lists the following components of an IRM curriculum (Montie, 1983):

- Awareness of information--the knowledge that it exists and the ability to locate it; its importance as a costly resource;
- Control over composition of data, its sources, dissemination, flow, location, and uses;
- Recordkeeping;
- Computer capacity; telecommunication circuit capacity and usage; office equipment and other expenses;
- Resource management theory and practice;
- Information Cost Accounting and Control;
- Reutilization of information;
- Need for a full time resource management staff similar to staffs for managing other resources, such as land, labor and capital;
- Background in organization dynamics and change;
- Organization skills--planning, programming, budgeting, etc.;

Figure 1

COMPETENCIES GENERIC ACROSS ALL FUNCTIONS WITHIN
THE ACADEMIC LIBRARY SETTING

KNOWLEDGE

ENTRY LEVEL

- knowledge of how to learn on an ongoing basis
- knowledge of performance expected and how it can be measured
- knowledge of job responsibilities and working conditions (e.g., range of duties, probable compensation, benefits, etc.)
- knowledge of the policies and procedures relevant to the library (or information center)
- knowledge of the various resources available within the library (e.g. personnel, equipment, etc.)
- knowledge of the users' information needs and requirements
- knowledge of the collection, and of related collections

SENIOR LEVEL

- knowledge of public relations techniques
- knowledge of statistical description, analysis, interpretation and presentation
- knowledge of cost analysis and interpretation methods
- knowledge of alternative management structures and their implications for the operation of the library
- state-of-the-art knowledge of library research and practice.

SKILLS

ENTRY LEVEL

- establish rapport with users and colleagues
- work independently and in groups
- develop criteria for evaluation

MID-LEVEL

- skills listed above are developed to a greater extent
- perceive the needs of the organization and not just the library
- anticipate long-range needs of library

SENIOR LEVEL

- skills listed above are developed to a greater extent
- apply methods of measurement and evaluation
- budget and make projections
- optimize the use of library resources

ATTITUDES

- respect for profession
- respect for the parent organization
- support of co-workers
- confidence
- fairness
- objectivity
- willingness to respond to authority, apply and follow policy
- attention to detail

- Broad-based understanding of information handling technologies, including micrographics, word/information processing, etc.;
- Library and information science;
- Statistics and other analytical tools;
- Understanding of concepts, methodologies and vocabulary of information systems and both manual and automated, and an overview of information acquisition, flow, storage and utilization;
- Paperwork--need, acquisition, manipulation, utility, regulation, burden reduction, audit and control; and
- Laws, statutes, and principles related to information policy and practices.

Daniel (1981) suggests that "it is the function of information resources management to manage both sides of the life cycle--the resource side and the user side." Further, she notes that "information solutions must focus on freeing human resources from routine tasks to increase the productivity of managers and decision makers." The skills related to the "Life Cycle of Information" are:

Life Cycle of Information

Resource Side	User Side*
1. Creation of information resources through drafting, revising, and keyboard entry	1) problem identification and definition
2) organization, storage and maintenance	2) design of alternatives
3) transmission and communication	3) choice of action and implementation
4) delivery and receipt	4) monitoring and evaluation
5) compilation and repackaging into other information products	

*follows the decision making/problem solving cycle

Daniel goes on to note that "involvement of an information specialist who understands the cost benefit trade-offs of various available technological solutions and the techniques of gathering, organizing, and storing information resources, and who also understands human information flows in organizations in combination with the end users of information, will create a more effective integrated information resources management system for the organization."

Specific descriptions of competencies for information resources management education from the for-profit segment of the economy are difficult to identify, however, Smith considers the primary role of such positions to maintain and enhance the corporate data base of information from which improved decision

making can be result. Skills she identifies are the abilities to (Smith, 1980, p. 26):

- maximize data independence for the organization;
- minimize data redundance;
- ensure data integrity;
- ensure data reliability; and
- ensure data security.

Other writers prefer to emphasize administrative skills rather than information-related skills. For instance, Synnott and Gruber (1981) suggest the following as important skills for the successful information resources manager:

- strategic planning;
- human resources management;
- knowledge of recent computer hardware and software;
- project management; and
- interpersonal skills, especially in the area of communication.

In the most comprehensive review of information resources management published to date, Levitan summarizes previous writings on IRM responsibilities, from which specific skills can be extrapolated (1982):

- planning and evaluation of information services;
- statistics gathering and analysis;
- marketing and related economic analyses;
- identifying, obtaining, organizing, and disseminating information to appropriate organizational members for decision making; and
- integrating information handling equipment and services into organizational decision making.

A common theme among all of these writers is the importance of individuals recognizing relationships between information, decision making, and organizational effectiveness.

Instructional Skills

Brassil (1983A) talks about skills needed by academic health sciences center librarians who have educational responsibilities. She lists two types of retraining programs necessary:

- one to maximize computational and information skills
- another to enhance research and educational techniques and skills

Brassil (1983B) lists 13 information management topics needed for decision-making and suggests that academic librarians should be knowledgeable about each:

- Diversity of information source
- Identification of the problem
- Problem analysis
- Descriptive elements
- Qualitative factors
- Phases of Dissemination
- Information formats
- Precision versus recall
- Access points
- Evaluation
- Current Awareness
- Personal files
- Technology

She states "In order to be conversant with the information industry and to keep learning fresh for our users, Information Management Education (IME) librarians must be one step ahead of current information management practice and adept in instructional techniques. Formal instruction must be implemented to develop basic computer literacy skills geared towards underlying concepts, terminology, functions and economics of computer hardware and software."

David N. King (In Press) asks "whether we are involved in teaching our clientele how to use libraries, or in teaching them how to access and manage information. Considering current trends in library user education, it appears that many libraries have made a decision: We are in the business of information, and our educational goals should encompass access to and management of information whatever its source."

Information Management

Buckland (in Boehm and Buckland, 1983) at a conference on education for information has suggested that the ideal Information Manager should have the following 3 traits:

- Skills in technical matters related to information handling such as indexing, programming, and cost analysis;
- An orientation toward serving people; and
- Leadership and management abilities which include interpersonal skills, a sense of mission, and a concern for tactics and strategy.

At this same conference, Spigai (in Boehm and Buckland, 1983) suggested that to produce relevant information services products requires the librarian to have intellectual understanding of on-line services, the database, its subject matter, and classification/index structures. "If library schools make the leap from curricula covering handling publications acquired outside the organization to print or electronic publications produced within the organization, job opportunities may open up within an organization in a horizontal manner." The ingredient missing is some information synthesis or analysis in the context of the organization's problems and environment. Skills required are different from those taught in most library and information science schools today. These skills are taught in other professional schools (law, business, finance, etc.)

Debons (in Boehm and Buckland, 1983) lists the following competencies that are an essential part of the work of information counseling:

- Knowledge Resources: Completion of several courses is required covering resources in science and technology, social sciences, business economics, and humanities;
- Database Management: An inventory of existing databases, their access and use;
- Information Systems and Technology: An understanding of the structure of information systems, the technology that is incorporated within them, and their use;
- Diagnostics: The determination of an information (cognitive) need, the development of strategy for meeting such need, the organization of material, and the evaluation of procedures;
- Behavioral Theory: Principles of personality, learning, and human information processing; and
- Programming: The ability to understand digital computer operations and their use in facilitating data and knowledge access and processing.

Debons goes on to note that "it takes a particular kind of person to be an effective information counselor. At present, those with information counseling skills require the talent for selling their abilities; they need to be especially sensitive in adapting their skills in situations where at first information counseling may not seem to be appropriate."

Knoll (Boehm and Buckland, 1983) writes that "education for information management thus becomes a most vital undertaking, far surpassing the notion that it is just one more program for technical and/or professional training.

The training of future information managers therefore must proceed within a philosophical framework which stresses the reciprocal responsibilities for the preservation of a humane social order."

He envisions a curriculum that is issue-oriented. "Its details will vary according to the needs of particular programs and to the insights of those who teach them. But a common denominator must be the exposure of students to at least some of the basic questions raised about the human condition by creative individuals of all ages and all cultures." Such a curriculum will:

- stress the unending obligation to assess the foreseeable consequences for human beings;
- recognize the indispensability of information management to modern society;
- stimulate debate on the economic, political, social and legal issues involved, both in the learner's own culture and in the world community;
- prepare the learner to come to grips with the inevitability of social and cultural change; and
- promote a professional ethic which teaches that the information manager, whose work encompasses the very fabric of society, must consider his position a public trust, whether or not it is legally subject to public control.

A summary discussion group chaired by Karen Tackle Quinn (in Boehm and Buckland, 1983) reviewed the educational avenues for the preparation of information professionals. Rapporteur Schlachter noted:

> In the group's view, information professionals would need to possess communication skills, an ability to do market research, an understanding of user needs and the environmental contexts in which they work, and a knowledge of the resources available to meet client needs. Further, the participants stressed the desirability of the information professional stimulating as well as responding to user needs; selecting and condensing as well as accessing information for the decision-makers...

On the other issues related to the role of the information professional, it was difficult for that group to reach either a consensus or closure. Explored but not resolved during that discussion session were:

- whether information professionals should be generalists, with broad training and viewpoints, or specialists with subject or technical expertise;
- whether some people should be trained specifically as information professionals or all professionals should have some training in information access; and

- if the information professional--after selecting, condensing, and organizing information for decision-makers--should participate further in the decision-making process.

Rapporteur Gary Purcell, Graduate School of Library and Information Science, University of Tennessee at Knoxville, reported on a discussion group chaired by Glen Zimmerman, of the Library of Congress which identified specific skill sets necessary to prepare individuals for the field of information management (in Boehm and Buckland, 1983):

- nonconventional information sources (Examples which were given included multiclient studies, strength and specialities of information brokers, and knowledge of how to evaluate and deliver information);
- how to market information products within one's own organization;
- the organizational structure of the information manager's parent organization;
- information policies within one's parent organization and in society in general;
- information technology accompanied by experience with various types of technology;
- information software--where to acquire it, how to use it, and how to evaluate it; and
- philosophy and ethics--exposure to ethical concepts which apply to information transfer.

The group identified additional areas in the education of information managers for the undergraduate level of preparation:

- psychology--knowledge of how people think (for possible application to information-seeking behavior as well as other areas);
- symbolic logic;
- statistics; and
- linguistics.

Interestingly, "there appeared to be support for the notion that preparation for the career of information management should begin with the identification of courses and competencies which would be obtained at the undergraduate level. The group also concluded that there was a need for more interdisciplinary cooperation and interschool planning for this career option."

In the classic report by Matheson and Cooper (1982), they discuss the management of academic information resources and list six essential functional responsibilities that must be met by academic librarians.

- Curatorship. The library must maintain a repository of resources that meets the primary information needs of the AHSC enterprise. It is responsible for acquiring, organizing, advertising, and making available books, articles, journals, media, and other content through direct lending, interlibrary loan, or other transfer methods;

- Education. The librarians actively participate in the AHSC educational program by instructing individuals in the concepts of information management, in the development of personal information systems, and in the acquisition of skills in using sources of information and the tools through which information can be found;

- Access. The library supports the transfer and use of information. Transfer services include the provision of documents through lending, photocopy, or other delivery methods. Utilization services include providing specific facts and information from the library's resources and searching bibliographic data bases to locate books and documents relevant to information questions;

- Research. The library has a responsibility to study the fundamental nature of biomedical information storage, organization, utilization and application in learning, patient care, and the generation of new knowledge;

- Brokering. From both external and internal sources, librarians locate and select information appropriate to solving a specific information problem, analyze it, and repackage it to facilitate its use; and

- Technical consultation. The library provides technical information relating to the storage, transfer, retrieval, and interfacing of bibliographic information systems to all AHSC personnel.

Tees (1984) lists the following competencies for librarians to function as effective managers:

- Students need to be familiar with basic theory in the fundamental aspects of management; and

- Students are involved enough to own the ideas presented and to be able to apply them in practice at a later date.

Although Hannigan (1984) focuses on a broad range of library education issues, her proposed skills related to management of information are:

- development of courses that focus on the critical abilities needed by an administrator or manager;

- courses in human factors and personnel problems;

- financial management that makes use of alternative technological approaches such as spread sheets and 'what if' planning devices; and

- development of courses in change theory and in the consideration of solutions to specific types of problems.

Most recently, a conference entitled "The Intellectual Foundations for Information Professionals," was held at Emporia State University, School of Library and Information Management in November, 1984. This conference explored similarities and divergencies among various information professions including computer science, library science, information science, records management information resources management, and information systems (Achleitor, in press). Participants presenting papers included Michael Buckland, Richard O. Mason, Forest Woddy Horton, Jr., Robert M. Warner, and Roger C. Greer.

The scope of these papers is significant in that the potential landscape for academic library education is broad, indeed. Indeed, one theme resulting from the papers presented at this conference is that library education must take a broad inter-disciplinary role of the information sciences and professions (a summary of this conference is provided in Appendix C). Elements from all of the following are necessary for a "well rounded" librarian:

- records management;
- design and implementation of information retrieval systems;
- archives, preservation, and conservation; and
- awareness and conceptual understanding of the inter-relatedness of the information sciences and professions.

Nonetheless, methods to integrate the "inter-relatedness" of specific competencies within each of these areas were not specifically detailed.

Summary

The review of the literature related broadly to education for academic librarianship and suggested competencies for academic librarians in the areas of information resources management, instruction, information management, and traditional areas of academic librarianship suggests the following:

- the range of suggested competencies for academic librarians is vast and there is no shortage of opinion as to what should be taught at schools of library and information science;
- there is much confusion over competencies that should be taught at a beginning or entry level program, such as the MLS, and competencies that should be taught at a post-MLS level--proponents for the teaching of specific competencies fail to differentiate between levels of the competencies that should be taught and at which point in the curriculum they should be taught;
- there is a failure to recognize the unique strengths and constriants of a specific education-granting institution, the specific needs of academic librarians within that institution's target audiences, and the belief that there is a "core" set of skills that can be taught which are likely to be appropriate for "most" academic librarians;

- practicing academic librarians stress competencies that are skill-oriented, i.e., doing specific things well with less emphasis on analytical, cognitive, and problem-solving skills;

- virtually no attention is given to providing reward structures for academic librarians that participate in ongoing education, providing methods that facilitate academic librarians to return to formal methods of instruction, or providing means by which the organization with be able to exploit the new competencies gained by such instruction;

- competencies which are frequently listed as necessary for academic librarians to face the future's challenges successfully are:

  - applying a broad range of information technologies to library operations

  - managing people and technology together, successfully

  - planning and evaluation of information systems

  - research skills

  - applying "business-like" administrative techniques to the academic library

  - integrating information management, records management, information systems management, and "people" management

- there is little awareness of the constraints and costs of providing post-MLS education within schools of library/information science;

- library/information science educators and academic librarians do not appear to engage in meaningful dialogue about improving educational opportunities for academic librarians; and

- there are few research and empirical studies about the impacts or results of specific educational programs in terms of the effects on the participants, the effects on the organization, and the effects on the host institution.

Although, there is no lack for suggestions about what should be done to improve the quality of education for academic librarianship. Few programs of post-MLS instruction, geared for academic librarians, and hosted by schools of library/information science have not been implemented and evaluated.

SYMPOSIUM

On December 7, 1985, the School of Library Science sponsored the Fall Symposium, "Education for Information Resources Management." Speakers at the Symposium included Evelyn H. Daniel, Dean, School of Information Studies, Syracuse University; Robert S. Runyon, Director, University Libraries, University of Nebraska at Omaha; and Herbert Achleitner, Associate Professor,

School of Information Management, Emporia State University. Runyon presented a paper entitled "Information Resources Management Skills for Academic and Research Librarians," (Appendix A); Daniel presented an overview of the IRM field in "Information Resources Management and Librarianship," (Appendix B); and Achleitner presented a summary of findings from the Conference on the Intellectual Foundations for Information Professionals: Criteria for New Educational Programs (Appendix C).

After these presentations, reactions were given by Joyce Davis, Assistant Director, Oklahoma State University Library; Don Smith, Associate Director, University of Tulsa Libraries; and Lou Wetherbee, Executive Director, AMIGOS Bibliographic Council. The comments covered a wide range of topics, however, a number of them dealt with:

- the difficulty of staying current in rapidly changing areas such as information technology;
- the importance of educational programs in planning, decision making, and implementing new services/programs;
- producing library school graduates who have "platform skills," i.e., can think on their feet, demonstrate information services to patrons, and are able to speak and make presentations in public effectively;
- the need for academic librarians to better develop their various skills and to "stay ahead" of recent advances in technology; and
- the need for library schools to be more responsive to the distinct needs of full-time academic librarians in devising program schedules and educational offerings.

The reaction panel discussed numerous factors that inhibit the academic librarian from continuing education opportunities, the demands of "the job" in providing little time for outside educational opportunities, and the limited rewards available for many academic librarians that do participate in post-MLS educational programs.

A lively discussion between the audience and the speakers/reaction panel followed. The audience included academic librarians and directors, library school faculty, students, and librarians from non-academic settings. Clearly there was a sense of frustration on the part of many of the participants. On one hand, they recognized the need to stay up-to-date with developments in library information science, yet on the other hand, many are severely pressed because of job responsibilities, declining budgets and resource support, and inability to attend formal classes and educational opportunities for a wide range of reasons.

Also evidenced in the discussion was some anxiety on the part of a number of academic librarians as to their ability to meet future challenges and respond intelligently to a changing environment. While part of this attitude can be explained by the difficult economic climate in the state at this time, some of it also results from a recognition that it takes time and resources to be able to "come up to speed" on some skills such as those related to technology, research, and planning.

Many of the participants voiced their concern about the "quality" of library school students which developed into a discussion of the difference between skills and competencies needed for entry level positions versus advanced positions. Stress was placed on the development of the IRM program as an advanced, post-MLS program. Clearly, many of the participants felt that as important as many of the basic skills might be, the library schools have a responsibility to provide advanced training as well.

An interesting discussion also took place regarding the role of the academic library directors in supporting the librarians in obtaining additional education. Comments from library directors (both in person and from the survey questionnaires) indicated little likelihood that librarians who completed advanced programs would receive increased salary. Generally, the librarians felt that there was little support and encouragement from host institutions for librarians to continue their education or complete advanced educational programs.

The open and frank discussion at the end of the symposium contributed to its overall success. A number of the participants wrote congratulatory letters regarding the success of the symposium and many participants stayed after the symposium continuing their "discussions" of some of the issues raised.

SURVEY QUESTIONNAIRE

A formal needs assessment of academic librarians in the state regarding the appropriateness of a post-MLS program related to information resources management was conducted in the Fall, 1984, prior to the Fall Symposium. A questionnaire (Appendix D) was developed for three sets of professional librarians: (1) academic librarians, (2) academic library directors, and (3) corporate librarians. The later group was included upon the advice of the Advisory Committee as a potential audience for an IRM program.

Questionnaires were distributed in September/October and analyzed in December/January. A total of 242 questionnaires were distributed to academic librarians and directors, and 48 to corporate librarians. The response rate was good, approximately 60% (127 of 211) for the academic librarians, and 77% (24 of 31) for the academic librarian directors. Responses from the corporate librarians were less than 20%, thus, were not analyzed.

A set of questionnaires was distributed to the director of each of the academic libraries in the state. The director was asked to distribute them to the professional staff with the self-addressed, stamped envelope. A follow-up reminder was sent to all the library directors who then sent a copy to each of the professionals.

A summary description of the respondents is given in Figure 2. The majority of respondents can be characterized as females in public, PH. D. or master's granting institutions with a MLS degree. They tend to be in the age bracket of 30-44 and typically are department or section heads. These characteristics are similar to that found by other studies of academic librarians in the state (McClure, 1983), suggesting that the responses are a valid sample.

Figure 2

DESCRIPTIVE SUMMARY OF RESPONDENTS

1. Type of institutional support

public	73%
private	27%

2. Institutional type

Junior College	14%	Master's granting	28%
Four-year	16%	Ph.D. granting	42%

3. Administrative Responsibilities

top administration (directors and assistant/associate directors)	27%
department heads (administer other professionals)	21%
section heads (administer non-professionals)	37%
non-administration	15%

4. Educational background

BA only	2%
MLS only	65%
double masters	24%
doctorate	8%
sixth-year certificate	1%

5. Years experience in present library

1 - 5 years	52%	16 - 20 years	6%
6 - 10 years	23%	21 or more years	6%
11 - 15 years	13%		

6. Sex

male	33%
female	67%

7. Age

25 - 29	8%	40 - 44	13%
30 - 34	16%	45 - 49	15%
35 - 39	30%	50 +	15%

Much of the data was analyzed in terms of those respondents who indicated "some" or "great" interest in an IRM program. The investigators believed that people who indicated "no" or "little" interest--regardless of the content--were not a potential target audience for such a program. A major part of the survey dealt with the perceived importance of a number of skills/competencies for an IRM program. The rankings of those competencies is shown on Figure 3. Interestingly, the need for writing skills was ranked highest of all skills, thus, suggesting the increased pressure on academic librarians to publish.

Figure 3

DESIRED COMPETENCIES AS RANKED BY NON-DIRECTOR ACADEMIC LIBRARIANS WITH "SOME" OR "GREAT" INTEREST IN AN IRM PROGRAM

Rank	Description	Score*
1	Writing Skills	4.44
2	Personnel Management	4.37
3	Basic Research Methods	4.28
4	Information for Organizational Decision Making	4.20
5	Microcomputer Applications	4.18
6	Integrating Library Activities with Larger Institution	4.15
7	Evaluating User Services	4.13
8-9	Applications of Bibliographic Utilities	4.11
8-9	Strategic Planning	4.11
10	Role of Information Management	4.04
11	Impact of Technology on Access to Information	4.02
12	Collection Analysis and Evaluation	4.01
13	Online Data Base Searching	3.91
14	Cost Analysis	3.89
15	Purchase/Evaluation of (Micro) Software	3.88
16-17	Technological Document Delivery	3.77
16-17	Design of Information Retrieval Systems	3.77
18	Cooperative Resource Sharing	3.70
19	Marketing Library Services	3.68
20	Automated Circulated Systems	3.66
21	Decision Support Systems and Mang. Inf. Systems	3.61
22	Indexing/Abstracting	3.58
23	Archives/Records Management	3.42
24	Applying Statistical Packages	3.41
25	Evolving Information Technologies	3.22
26	Computer Programming Languages	3.18

*1 = no competency; 3 = some competency; and 5 = exceptional competency.

It is interesting to note, also, that the ranking of the competencies was all above a level of 3, or "some competency" needed. Indeed, virtually all of the competencies listed received support by the academic librarians. Further, the emphasis on competencies related to research skills, information for decision making, microcomputer applications, and planning and evaluation is evident.

The data also were analyzed to determine if any relationships existed between the likelihood of participation in a post-MLS program in the area of information resources management and other variables. As shown on Figure 4, respondents with a double masters degree, 30-39 years of age, and those listed as department heads appear to have greater interest in participating in the program than other respondents.

Figure 4

RELATIONSHIPS BETWEEN LIKELIHOOD OF PARTICIPATING IN A POST-MLS IRM PROGRAM AND SELECTED VARIABLES*

Relationship between likelihood of participation in the program and... Variable Name		Relationship
1.	Institutional type (public/private)	No relationship
2.	Institutional status (junior college, four-year, Masters granting, or Ph.D.)	No relationship
3.	Education	Respondents with a second masters degree have much greater interest in the program than other respondents (significant at the .01 level)
4.	Sex	No relationship
5.	Administrative Responsibility	No statistically significant relationship, but department heads had greater interest than other respondents
6.	Age	Respondents 30-39 years old have greater interest in the program than other respondents (significant at the .05 level)

*A chi-square test of association was used for this analysis.

The questionnaire also elicited information about the respondents' preferences for scheduling and other program factors. A summary of these responses is provided in Figure 5. Clearly, the academic librarians believe that the major benefit from participating in the program will be increased sense of accomplishment and status. They perceive minimal institutional support to be available, prefer all day Saturday classes every two weeks, and prefer about a 50% allocation of program time to in-class activities and 50% allocated to independent/directed studies.

Figure 5

RESPONSES OF ACADEMIC LIBRARIANS (NON-DIRECTORS)
WITH "SOME" OR "GREAT" INTEREST IN A POST-MLS IRM PROGRAM

1. Perceived Benefits from Participating in such a Program*

obtain salary increases	13%	increased status	78%
obtain new position	21%	improved marketability	30%
sense of accomplishment	82%		

2. Institutional Support Available*

sabbaticals	27%	tuition reimbursement	16%
release time	55%	leaves (without pay)	22%

3. Preferences for Class Scheduling (scale of 1-3, 1=highest preference)

all day Saturday every two weeks	1.5
evenings once a week	2.3
Six day intensive week	2.3
Friday/Saturday Combinations	2.4

4. Factors Affecting Decision to Participate in a Post-MLS Program (scale of 1-3, 1=highest preference)

program content	1.2	likelihood of getting a better position	1.9
class scheduling	1.2		
distance to classes	1.4	availability of institutions support	1.9
program costs	1.7		
commitments to family	1.7	availability of scholarships	2.1

5. Preference for Amount of Program time to be In-class

1-25% of program in class	4%	51-75% of program in class	28%
26-50% of program in class	43%	76-99% of program in class	25%

6. Need for Scholarships

No scholarship needed	48%	$1250 - $1500	5%
$250 - $500	11%	$1750 +	8%
$750 - $1000	13%	Yes, but no amount given	15%

*Percentages shown represent the number of respondents selecting that particular factor or item.

The most importance factors affecting their decision to participate in a post-MLS program is the program content, class scheduling, and the distance to classes. The need for financial support via scholarships suggests that about half of the respondents would not require a scholarship to attend class, but that the other half would require such encouragement. Further, 41% would require $750 or more (upwards to $2000) to attend such a program.

The questionnaires sent to the academic library directors had an additional set of questions (see Appendix D). A summary of the responses from the academic library directors is given on Figure 6. Although 83% of the library directors would actively support participation of their librarians in such a program, the degree of institutional support available is limited largely to re-scheduling of work time, provision of release time to attend classes, and leaves without pay. Further, there is little likelihood that librarians completing a post-MLS, 15-hour certificate program would receive a salary increase. Similarly to the responses of the librarians, class scheduling was seen as one of the most important factors to be considered in the design of the program.

Figure 6

RESPONSES OF ACADEMIC LIBRARY DIRECTORS ON SELECTED VARIABLES

1. Institutional support available for librarians wishing to obtain additional education*

re-scheduling of work time	75%
release time to attend classes	67%
leave without pay	63%
sabbaticals	29%
reimbursement for tuition	25%
no direct support available	13%

2. Would the director actively support participation in a post-MLS program?

Yes	83%
It depends	17%
No	0

3. Increase salary expectation for a librarian completing a post-MLS graduate program at the Director's institution.

no salary increase	65%
up to $500 per year	26%
$500 to $1000 per year	9%

4. Ranking of factors that would encourage academic librarian participation in a post-MLS program (scale of 1-3, 1=highest ranking)

class scheduling	1.2
emphasis on practical skills	1.3
convincing librarians as to the program's importance	1.3
reduced amount of time in-class	1.7
awarding of scholarships	1.8
bringing in "big-name" speakers	1.9

*Percentages shown are responses for each particular item or factor.

Overall, the survey identified some 70% of the academic librarians who indicated "some" or "great" interest in a post-MLS program. Clear preferences were given for scheduling and other factors affecting the decision to attend such a program. Perhaps as important as the formal analysis of the results were the numerous penciled-in comments on the returned questionnaires which offered encouragement and support for the development of such a program and obtaining additional information about such a program if it were to become available.

SUMMARY AND RECOMMENDATIONS

The planning grant resulted in the review of information from four areas regarding education for academic librarianship and the appropriateness of a post-MLS program in Information Resources Management: literature review, Fall Symposium, Survey Questionnaire, and discussions with deans/directors of library and business schools. The review of this information gave support for the development of an implementation proposal to the Council on Library Resources for a 15 credit hour, post-MLS certificate program in Information Resources Management.

Overall, there is much more talk about educational programs for post-MLS academic libraries than there is action. The adage that "talk is cheap" certainly appears to be true in this instance. However, post-MLS programs for academic librarians are technically possible, conceptually strong, and quite feasible. The limited attempts to mount such programs result from an historical inattention to educational programs geared to practicing academic librarians, start-up costs for planning and funding such programs, the perceived priority of specialization educational programs versus other programs in Schools of library/information science, difficulty in obtaining technologically knowledgeable instructors, and limited reward/encouragement structures for participants.

In the development of such a program, a number of conclusions from the planning grant should be considered. First, there is general agreement that a specialized program in Information Resources Management is not only appropriate, but desired by practicing academic librarians. However, regardless of how appropriate or important the topic for advanced study, the program must be individualized, have flexible scheduling and not require significant amounts of "on-campus" time, provide "hands-on" experience with various information technologies, be interdisciplinary, and must provide for a marriage of both practical skills and conceptual breadth.

Second, discussions with deans/directors of other library schools warned against the development of a "stand-alone" specialization, post-MLS program regardless of the topic. Such programs must be integrated into larger programs such as those at the Ph.D. or Sixth Year Certificate level. The view of some directors is that such programs should keep as low a profile as possible since "continuing education" is not given high priority and receives little support in academic institutions striving for status in the areas of research and scholarly publication.

Third, effective programs for post-MLS education will require up-front capitalization because of the need for various technological equipment such as

computers and software. One Dean at a Business School commented, "Schools of Library and Information Science have not realized that education for the information age is impossible with hand calculators and Commodore 64s." Without adequate technological support, such post-graduate programs are not likely to meet the needs of participants and are likely only to "repackage existing courses and instruction under new and fancy titles."

All sources of information reviewed as part of the planning grant reinforced the view that post-MLS education for academic librarians is essential for improving the effectiveness with which they provide access to unique and valuable information. Paradoxically, few formalized efforts have been supported to design, implement, and assess an integrated and coherent post-MLS, non-Ph.D., non-internship driven program for practicing academic librarians.

There is considerable enthusiasm on the part of academic librarians for the development of specialization programs targeted to meet their individual needs in the broad area of information resources management. What remains to be resolved is the degree to which academic librarians, library educators, and its larger academic community can marshal their forces to address these needs and design/implement such programs.

APPENDICES

APPENDIX A

INFORMATION RESOURCES MANAGEMENT (IRM) SKILLS FOR ACADEMIC AND RESEARCH LIBRARIANS

Robert S. Runyon

Library Director
University Library
University of Nebraska at Omaha
Omaha, NE 68182

Presented at the Fall Colloquium:
"Education for Information Resources Management"
convened at
The School of Library Science
University of Oklahoma

December 7, 1984

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2. Library Decision Making Requirements

3. The Role and Mission of Libraries

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5. First EDP & MIS, Then DSS, and Now IRM

6. Conclusion

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1. Introduction

Responding to the increasing demands of society for technical and specialized information of all types, librarians have endeavored to develop more sophistocated and responsive techniques for information service and management. Also, with the accelerated development of optical and electronic technologies to facilitate the manipulation of information in a vast array of new formats, the role of librarians as information providers is now undergoing significant change. An increasing range of technical and managerial skills are now essential for the organization and provision of advanced levels of information services to specialized users. A description of the librarian's changing role, coupled with an exploration of the underlying knowledge and skills which that role requires now and in the future, are the subjects of this paper.

Types of Decision/Task	A Operational Performance	B Operational Control	C Management Control	D Strategic Planning
(1) STRUCTURED	Revise cataloging Directional reference questions.	Establish authority file entries. Decide on book purchases.	Devise overall policies and procedures. Budget analysis	Allocate budget cuts. Plan building modification
(2) SEMI-STRUCTURED	Write pathfinder guide to collection. Offer bibliographic instruction.	Develop dept. goals/objectives. Hire operations personnel.	Implement an MBO program. Develop job classification	Establish long range goals/objectives. Decide to open or close a branch lib.
(3) UN-STRUCTURED	Original cataloging of unique work. Research reference inquiry	Plan inter-dept. workflow. Implement new system.	Recruit, select & train admin. personnel Budget preparation	Design a new service. Select computer system
RANGE OF TASK DIMENSIONS	individual discrete tasks internal (Dept.) short-range low-threat technical expertise specialized	WORKING MODE COMPLEXITY PERSPECTIVE PLANNING FRAMEWORK POLITICAL PROCESS AUTHORITY KNOWLEDGE		group processes interaction effects environmental long-range conflict/hi-stakes accountability integrated
EDUCATION & SKILLS	BA, BS, MLS. Liberal education Library service & Info. Science	Advanced analytic skills (qualitative and quantitative). Integrated conceptualization of organ. goals and functions. Superior communication skills (written, verbal, interpersonal).		MBA, MPA, MA, MS, PhD, etc.

Chart 1

2. Library Decision Making Requirements

The emphasis in this paper upon management decision making tasks within a library organization may seem unwarranted to many librarians, and might even surprise library users. Libraries are not typically regarded as very large or complex organizations requiring high degrees of management expertise. It is only their growth in size, complexity, and specialized capabilities within the last twenty years (Runyon, 1977) that accounts for the fact that there are now special needs for librarians with sophistocated managerial skills. Likewise library education has not been especially oriented towards preparation for managerial decision making, but rather towards professional acculturation and training in specific processing functions and service activities. It is suggested here, that if libraries are to remain viable and competitive in an information rich society impelled by technology and dominated by large organizations, it may be necessary for library education to place more emphasis upon the development of the managerial qualifications and attitudes of young professionals entering the field. On the other hand, if management oriented graduates are later received (as many now are) into library organizations which offer only low-paying, routine jobs composed of maintenance level tasks, the quality of library services will remain unnaffected. It could also be argued that academically oriented, managerial training is more appropriately imparted through other advanced degree programs (such as the MBA or MPA) or through continuing education offerings.

Chart 1 provides a brief taxonomy of decision making requirements across a broad spectrum of library tasks and responsibilities. The original idea for this matrix was derived from the works of a number of writers on Management Information Systems (MIS) and Decision Support Systems (DSS) (Keen & Scott Morton, 1978; Bennett, 1983; Gorry & Scott Morton, 1971). Several writers in the library field have also produced adaptations of this matrix (Heindel & Napier, 1981). Traversing the chart laterally from columns A to D, is a progression of tasks that corresponds roughly to those performed by a librarian going from initial professional to top management responsibilities. Descending the columns, from (1) "structured" to (3) "unstructured", is an ordered array of decision situations that begin with well-defined problems, and end with broader, more complex or open-ended issues. This distinction between decisions which are structured and others that are unstructured reflects an information processing perspective on library administrative tasks. The chart treats administrative activities as qualitatively different from (not superior to) other professional library activities. At the bottom of the chart is a horizontal progression of task dimensions, skill enhancements, and formal degrees, which in some settings may be considered appropriate to increasing administrative responsibilities. The clear implication is that it is no longer realistic to refer to a terminal

M.L.S. degree for all professional librarians.

For most librarians, decision making has traditionally been concentrated in the top-left cells of the matrix in Chart 1; that is, to highly structured tasks at an operational level. Many of the routine tasks involved both in the processing of materials and in rendering services are of this nature. These activities are essential and constitute a foundation for all other library service capabilities. All librarians should be inculcated with the skills and values of these tasks. But the requirements for handling semi-structured and unstructured decision making tasks in operational and administrative contexts seem to be increasing. This can be seen in the changing technical, organizational, and political issues now facing both operational and administrative personnel. Some of the issues now requiring management control and strategic planning in large libraries involve expenditures of many millions of dollars and major commitments of other institutional resources as well. The planning and decision making skills appropriate to this level of responsibility are distinctly beyond what has been customarily expected in libraries in the past.

Likewise in the new field of Information Resources Management (IRM), it is the increasing financial and personnel resources commitments for information systems purchase, maintenance, and operation, that have dictated the need for more advanced levels of planning, technological integration, and management control - in a word, greater accountability. An example may help to clarify this point. In South Carolina (a relatively small state), state expenditures for electronic data processing increased from $10,000,000 to $180,000,000 between 1960 and 1980 (Marchand, 1984). That increasing level of investment and commitment of resources highlighted the rational requirement for overall management effectiveness and efficiency. On a smaller scale, several academic libraries are now budgeted at over $10,000,000, and in a few of these institutions expenditures for computer services are in the vicinity of $1,000,000 per year.

3. The Role and Mission of Libraries

The emphasis upon decision making in this paper is not restricted, however, to that particular task as a skill requirement for those who manage large libraries. It derives also from the equally important observation that information handling organizations, of which libraries are now simply one generic sub-species, are undergoing broad and fundamental changes within our society. The rapid development of powerful, computer-based information systems for research and organizational decision making is already having important effects upon the the place of libraries within the total mix of information providers.

Libraries of all types have traditionally occupied a well-defined and often favored niche within their respective constituencies (municipality, academy, corporation, or school). Certainly their collections, and to a lesser degree their information service support roles, have been generally

understood and valued by library users. Unfortunately, most people seeking current facts, data, or information for decision making still do not perceive library institutions as primary resources to meet their needs. This statement is confirmed by each of the library user surveys with which this writer is familiar. Libraries typically rank fifth or lower in the priority of information resources or services consulted - behind personal collections, friends, colleagues, office files, conventions, etc.

The prototype of academic library collections is a carefully selected set of retrospective, printed materials once produced by acknowledged authors as formal publications. The library in a public university is generally expected to offer free and unrestricted access to expensive resources that are beyond the private means of the individual. The library's function has been conceptualized primarily as that of a conservator to provide a retrospective storehouse (or museum) for the best books and other publications of and about the past. Less frequently, is the library also perceived as an up-to-date and highly responsive resource for the latest available information or expertise about the present or the uncertain future. The collection principles in academic libraries have traditionally emphasized a balanced selection of quality materials, representing a sample of the universe of recorded knowledge, or what one "ought to know" within a given subject area. The collections are popularly viewed as the accumulated knowledge of the academic disciplines and the professions, plus a smattering of contemporary information. Of course, academic library collections usually include a gamut of other materials, including reports, documents, near-print microforms, audio and video recordings, as well as graphic materials of various types, but most potential users are not aware of the actual content and coverage of these collections.

The importance of the above observations and Information Resources Management (IRM) for library education is precisely this: only special libraries (and to a much lesser degree, the large research libraries) have been organized to take seriously the task and decision making contexts in which their patrons need and employ information. In contrast, the concept of information service within the new fields of IRM (and DSS) is based upon the generation of computerized databases, and the provision of customized reports and other outputs tailored specifically to the needs and behavioral characteristics of specialized users. Daniel has indicated that, "For information use to follow an optimum pattern for decision making, we may need to place less emphasis on the technical structure of information (ie. data) systems and more on the the behavioral attributes of information users" (Daniel, 1981). Special librarians learned this lesson long ago in the information marketplace as a condition of their survival. Not surprisingly, their collections also seldom grew so large as to become self-justifying satrapies as they have occasionally become in academic libraries. Thus for libraries to retain or improve their current niche in the broadening spectrum of information providers, it may be necessary that their mission be extended to include the provision of customized materials and services that offer more

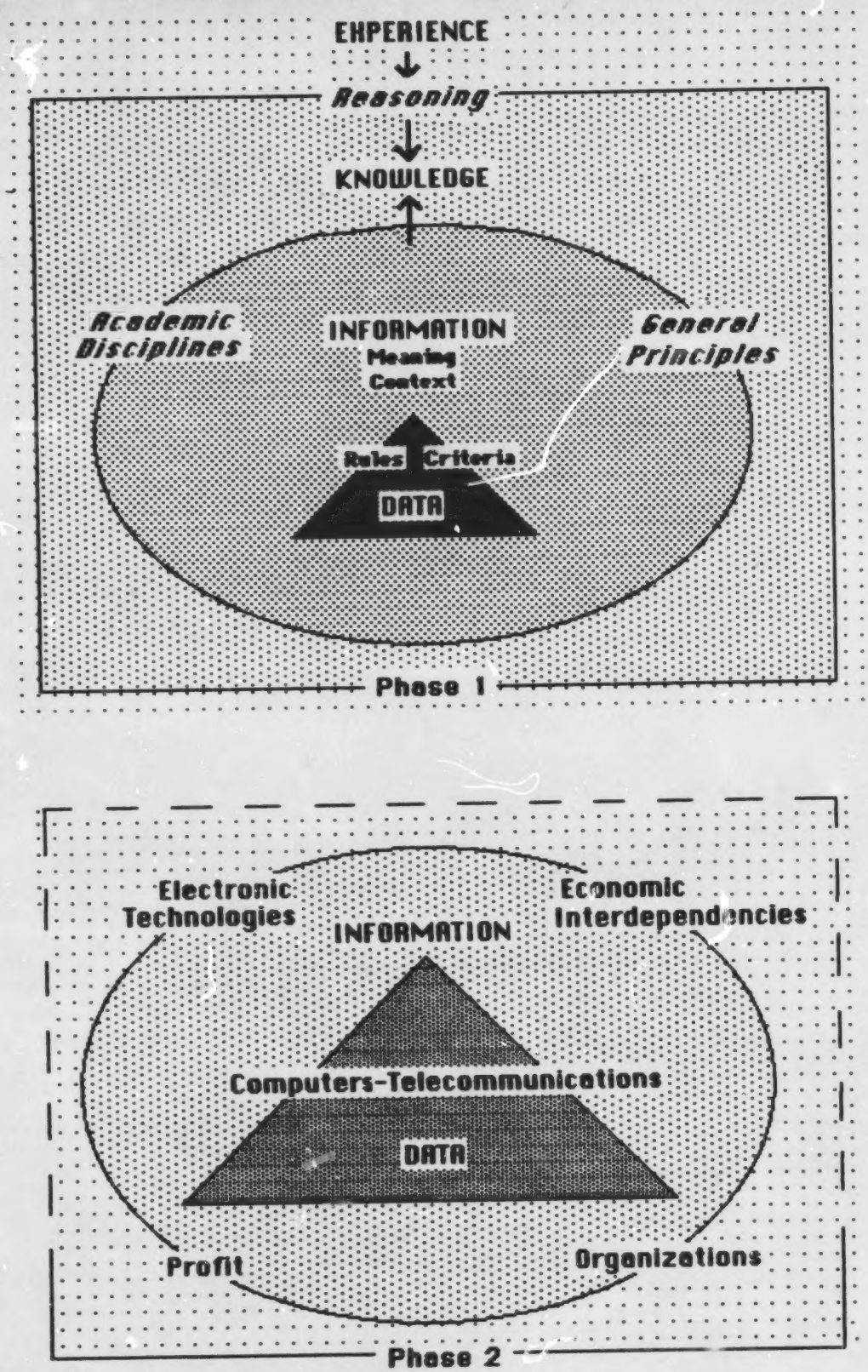
individualized information and decision making support to their users.

4. Up From Data to Information Management

Because of the dynamic developments how occurring in data and information processing technology, this paper is also concerned with changes in the meaning of information, and with the role of academic libraries within the evolving, electronic information environment. "Information" is actually a high-level abstraction that is often used uncritically as a label referring to many very different things. It is variously employed in common speech as well as in specialized contexts, and the generality of its possible applications sometimes obscures the user's real meaning. There is much discussion in the contemporary, popular press of our evolving "Information Society," and while that usage was based upon fundamental economic analysis, it also attaches new connotations to the word "information". The catch-all nature of the term was borne out in a survey of managers from several, middle-size American companies who were asked to define it; It was variously defined as, "something that precedes action," "an idea, opinion, feeling, or fact," and as "a unit of something to which humans assign meaning. (Goldhaber, 1979)" Professionals in the field of information services have an even richer repertoire of meanings for information, but one of the basic distinctions that is often made is that between data and information. Referring to the models in Figure 1, "data" denotes raw numbers, letters, or graphic symbols that record measurements or specific items of intelligence. "Information", on the other hand, connotes aggregates or interrelated elements of data that convey a broader range of meaning and a fuller message within a specific context. "Knowledge", is still a higher level term, which refers to a body of abstract information that is integrated and tested according to the "principles" of a given methodology or intellectual "discipline". Some of the logical relationships between data, information, knowledge and experience are depicted in Phase 1 at the top of Figure 1. These concepts may be viewed as changing entities in a continuum of relationships and applications:

Analogies and Applications Continuum

DATA ⟶	INFORMATION ⟶	KNOWLEDGE
Data element, Record	File	Report
EDP, MIS	DSS	Expert Syst., A.I.
Needed for analysis	...for decisions	..for understanding
Task-related	Job-related	Career-related
Detailed	General	Theory
Practitioner	Manager	Researcher
Operational control	Management control	Strategic Planning
Quantitative description	Qualitative judgment	Synthesis
Micro-organism	Plant	Animal
Atom	Molecule	Compound
Low entropy		High entropy



Electronic Information Becomes a Commodity

Figure 1

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The "entities" are conceptual and not strictly objective, and the models are designed to symbolically represent significant aspects of the changing relationships between the entities.

> The operating envirnment....is formed by an image that is a conceptual, symbolic entity, and "viewed" through the artifices of symbolic data that are representational entities. The psychological structures of human information processors are themselves functional entities evolved through human experience. In short, human information processing is a process of conceiving, perceiving, symbolizing, representing, constructing, operating, and interacting with entities. All of life is engaged in dealing with packages of relationships. (Dunn, p.295 -296)

Occasionally graphic models may be helpful in establishing a conceptual framework for visualizing complex inter-relationships, and for suggesting new ways of integrating abstract ideas. Figure 1 symbolically represents separate levels or domains of analysis which may be useful in protraying the evolution of technologies for the handling of information as a commodity. While data and information are ofen used interchangeably in colloquial speech, they represent quantitatively and qualitatively different levels of conceptualization. Data may be conceived as atomistic components of information, which begin to take on particular "meanings" through the application of "rules" and "criteria" in specific "contexts". The older, EDP and MIS technologies have dealt primarily with the manipulation of atomistic, alpha-numeric data, and therefore have had only restricted impact upon the operation of true information and knowledge availability systems. Phase 2, depicts the conversion or reduction of complex information entities into data entities. This happens through the application of more powerful "computer" and "telecommunications" technologies. In this current phase, more information is being computerized through a process that is driven by the "profits" and "economic interdependencies" that are spawned by the new "electronic technologies" developed for use by large "organizations". One may envision a Phase 3 which a larger part of human knowledge and even of "experience" is accessible to the developing electronic technologies.

An historical summary of the rapidly developing technologies for processing data, information and knowledge is diagrammed in Figure 2. Computers were first used primarily to treat atomistic data in the early period of electronic data processing (EDP). Later computers performed more complicated manipulations on a wider array of data or information elements that were also combined into large databases. This began the era of Management Information Systems (MIS) and Decision Support Systems (DSS). Now we are beginning to witness the development of large, integrated systems in which it is possible to create comprehens information

environments, and to manipulate even larger quantities and higher levels of information, as well as recorded knowledge.

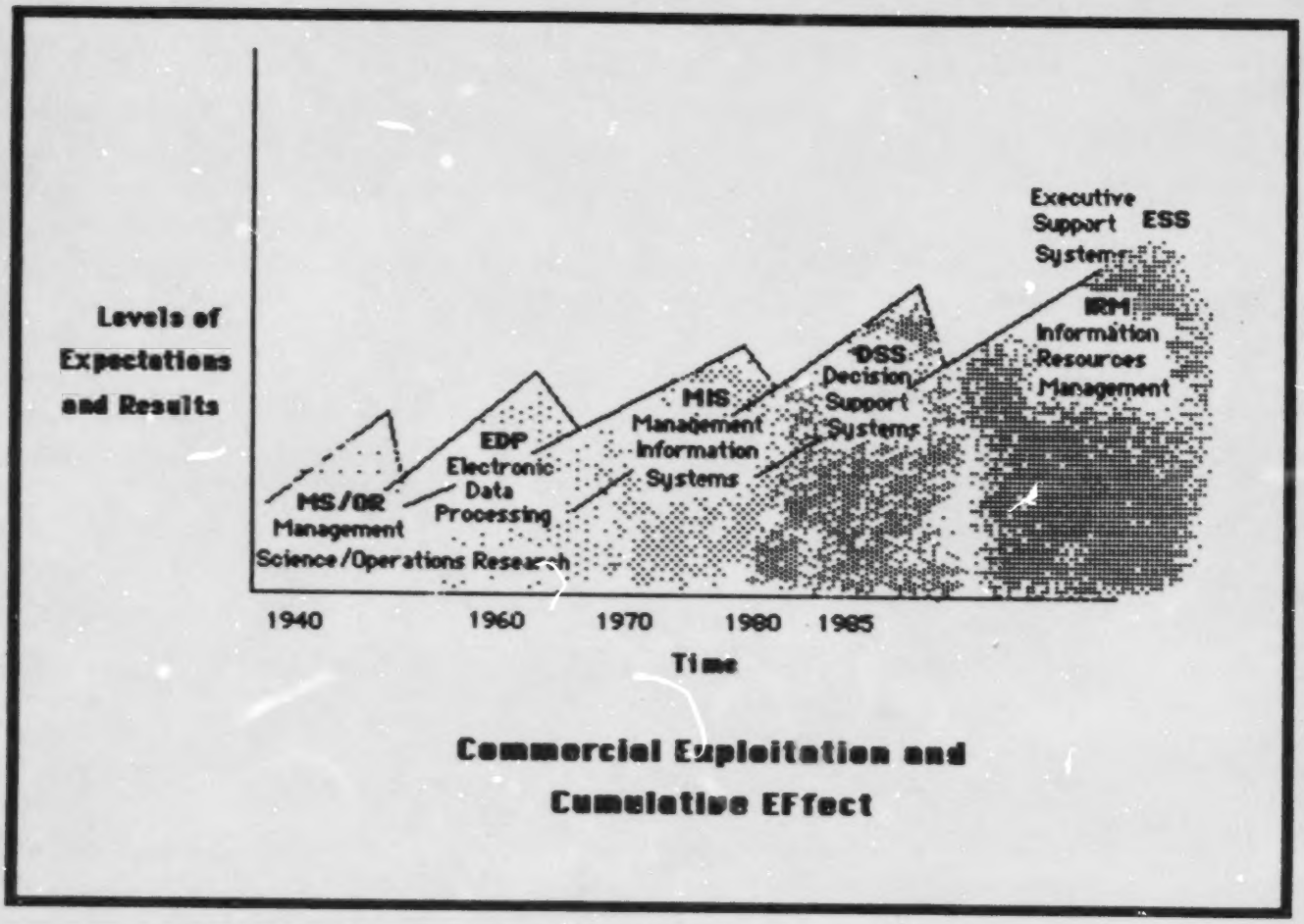
5. First EDP & MIS, then DSS, and now IRM

Within the last two decades there has occurred, especially within industry and government, the development of advanced, computer-based data systems called Management Information Systems (MIS) and Decision Support Systems (DSS). More recently, there has been discussion, particularly within the business and government sectors, of the new concept of IRM. It received widespread attention within the Commission on Federal Paperwork (1974-75), whose work led to the landmark Paperwork Reduction Act of 1980. Forest Horton, who directed an Information Management Study for the Commission, is generally credited with having coined the term (Horton, 1982)..

The basic concepts of IRM emerged from analyses of the data handling and information reporting functions of federal agencies. Through the initial work of the Commission, there was expanded awareness of the enormous paperwork burden associated with the processes of the U.S. government. The problems of handling the data and documents that are generated to record and transmit the on-going work of government had become so overwhelming, that there was need for government-wide information policies, coupled with systematic analysis and planning for the economic and effective use of systems to support information access. Concern intensified for integrating the many separate, duplicative, and incompatible systems for processing and exchanging data, both within the government, and between the government and the private sector. "The principles of Information Resources Management are that information can be:

A. Identified, measured, and costed at each process step
B. Planned just as other resources are planned
C. Budgeted as line items, rather than as overhead
D. Managed by balancing the value received against costs incurred
E. Accounted for and audited in a similar manner to other resources (Landau, p.8)"

Influenced by the work of the Commission on Federal Paperwork, data processing professionals and business consultants (Diebold Group, 1979) began evaluating the data processing functions of large business firms from a broader IRM perspective. Many instances were found for application of the principles and precepts of IRM to the corporate EDP and MIS functions. It should be noted that the expositors and advocates of IRM within government and corporate settings have not spoken to the direct or immediate application of the concept to information handling in libraries. Instead, their audience at present is largely EDP or MIS managers and executives in large companies and public agencies. An executive of the Diebold Group, the major consultant in



Commercial Exploitation and Cumulative Effect

Figure 2

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the field, confirmed this in a conversation with the writer. On the other hand, if the electronic information environment for organizational decision making becomes truly integrated and rationally managed as proposed within IRM principles, it is apparent that first special libraries, and later other libraries, must be importantly affected. At the very least, the comprehensive information policies and environment projected by IRM could become an overall technical and administrative framework for some library services and operations. Even more to the point, there are within IRM several innovative ideas about the nature of information and its use within an all-pervasive electronic environment that should be culled and applied to the management and delivery of information within academic libraries. McClure has reviewed and discussed some of these developments in their relationship to libraries. The importance of MIS, DSS, and IRM for the current discussion, relates both to the future decision making tasks of library managers, as well to the mission of libraries now and in the future.

6. Conclusion

The paper presents the fundamental position that the decision making requirements of library administration are becoming more complex, requiring greater planning, technical, and political acumen. A taxonomy of decision types, examples, and task dimensions, was given from which education and training requirements may be extrapolated. It is recommended that graduate library education curricula include additional offerings which emphasize the development of analytic, technical, and communications skills related to the new area of Information Resources Management. These offerings may originate within, outside, or beyond the standard M.L.S. curriculum; that is, they may be primary program requirements, courses taken in other departments, or continuing education offerings for library practitioners in the field.

A secondary and supporting argument was presented, under which it is concluded that the role and mission of libraries of all types are now subject to dynamic change. Electronic technologies and multiple channels of information access, now dilute the value of formerly, unique library collections, and offer new challenges to libraries as providers of task-relevant information. Unless librarians understand and respond to the decision making needs of their users, it seems likely that libraries will be increasingly relegated to the narrower and more limited roles of archival preservation and of retrospective, information search inquiries.

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APPENDIX B

INFORMATION RESOURCES MANAGEMENT AND LIBRARIANSHIP

November 23, 1984

Evelyn H. Daniel

There are a number of laws of life. For example, there is Erma Bombeck's law, "Never go to a doctor whose office plants have died," and Woody Allen's "The lion and the lamb shall lie down together, but the lamb won't get much sleep," and one attributed to J. Paul Getty, "The meek shall inherit the earth but not the mineral rights." There is a law in academia that goes like this: "It is fortunate that God created the universe according to the traditional academic disciplines" and its corollary, "Every academic field has its own jargon and there is no Rosetta stone."

Yet the library is supposed to be that Rosetta stone -- the key to disciplinary knowledge as it is currently structured, to past stores of knowledge organized along very different disciplinary lines, and to emerging fields of knowledge now in the pre-disciplinary stage. Not only must the library somehow accomplish this prodigious feat, it must also create the syndetic networks to connect scholarship in one field to that of other, often unrelated. It is the library's primary mission to provide the access mechanisms to the world's ever-growing and dynamic information stone. Today's Rosetta store is the library.

Of course it is an impossible task. It is true of all professional fields that their primary missions are impossible to achieve absolutely. This is the primary difference between the professions and the sciences. As professionals we are problem-solvers seeking mini-max solutions in the short term while struggling to develop a future vision and to bend energy towards long-term change.

The major barrier to change is probably not the unwillingness to abandon the status quo but rather the lack of a clear picture of what the future might be. I want to try to provide for you today a direction and a vision for the profession and, in particular, for academic librarianship.

I will address three points. I will first talk about the concept of information resources management using the library as my touchstone. Next I want to address the academic environment, the changes that are taking place and their implications for future academic librarianship. Finally I will suggest a way of looking top-down at the curriculum of the library/information school concentrating on three primary substantive components of a good education today: theory, problem-solving skills and the study of the environment.

Concepts of Information Resources Management

In librarianship we have always been aware of the fact that we deal with two quite different aspects of our information store -- the physical and the intellectual. The acquisition, storage, retrieval and circulation of the physical book has been the model in our profession for handling information containers of every sort. Our technology for performing physical tasks has changed some but at a fairly slow pace. We spend a lot of time processing, handling and preserving the physical resource. We employ a lot of people in the library who deal with the physical aspects of our information store.

As an aside, I don't believe I've ever worked in any library (and I've worked in a great many) that didn't move a substantial proportion of the collection from one place to another. This is, of course, in addition to the reshelving and retrieving that is a daily activity. Today academic librarians are pouring a lot of energy into the preservation aspect, employing new methods to refurbish and conserve some of the physical resources.

Sometimes there are problems caused by material that doesn't comfortably follow our physical book handling model process. Microforms require readers and printers and special lighting conditions. Photoduplication machines are now ubiquitous. Some libraries hold facsimile transmission equipment. The whole array of nonprint material brings with it an astounding assortment of equipment -- projectors of every kind, recorders, players and amplifiers. Computerized data tapes require stand-along micros or terminals connected to larger computers elsewhere. Videodiscs connected to computers are yet another new physical container poised on the horizon. We may not realize how important the telephone is as a physical resource for the library.

As the library has attempted to accommodate to these new physical resources using the old 'book' model, it has found shelving problems and labeling problems. Retrieval and use often mean bringing together two physical objects stored in different places. The book doesn't need much maintenance; the machines need constant maintenance often of a complex character. Books have few peripheral parts; the machines have many -- fuses, lamps, styli, belts, cords, modems, communication boards, etc. Books are generally hardy within a fairly wide range of temperature and humidity; the newer materials and their machines often aren't. Books are portable. Machines require power connections and sometimes telecommunications links and other special conditions for use that make them less portable.

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It is apparent that the model for handling physical resources in libraries is not adequate to the variety and kind of the resources currently handled. It is also apparent that many of the physical resources are not manipulable as unitary items. They are linked in complex and indivisible ways to other physical resources all over the campus and increasingly off campus as well. A new methodology for handling physical resources is needed. One assumption of information resources management is that the physical information containers and carriers today are no interconnected that a centralized management approach is necessary even though the resources themselves may be decentralized.

Consider the telecommunications linkages. They may be through coaxial cables, fiber optics, microwave disks or plain old twisted pair telephone wire. Unless a centralized management approach is taken, there will continue to be separate and often multiple systems for video, voice and data transmission. As we move rapidly toward electronic mail it makes sense to integrate the mailroom under the same centralized management agency. Without central planning we have duplicate systems and links to nowhere.

Our information store no longer is enduringly tied to one physical container. Parts of a book are photocopied. Photocopies of a variety of book parts and journal articles can be rebound into a new container. Electronic typeset means online journals and indexes coexisting side by side with print journals and printed indexes. Data can be downloaded and recorded on audio cassettes. Films can be videotaped; videotapes can be filmed. Slides can be created from diagrams in books and from graphic representations on the video screen. The transformation of information from one physical container to another is getting easier and faster all the time. The current unit of information is no longer the book; it is not even the journal article. At present it is probably the abstract but with knowledge-based expert systems, soon it will be the discrete fact, probably in sentence form.

Bill Paisley in a recent presentation at ASIS spoke of the problems we increasingly face with static object-oriented approaches. He suggested the need to concentrate now on process-oriented approaches. Considering the fluidity and dynamic nature of our physical information carriers today, it is clear that our past object orientation must give way to process approaches in dealing with the physical problems of resource management.

And if this is true of the physical problems of information resources management, it is doubly and triply

true of the intellectual problems of information resources management. Access mechanisms in libraries usually refer to the intellectually based systems that serve as pointers to the physical information store. Much of the change in the library technology has occurred in the automation of the intellectual processes.

For years the card catalog served as the primary access point for the oldest resource -- the book. The library has been circumscribed by a 3x5 world for more than a century. The primary intellectual technology of the library involved the application of cataloging rules to describe certain attributes of the physical book and the application of standardized subject headings and classification schemes to describe the substantive knowledge content within the book. Periodicals came later and their access systems developed somewhat differently -- not the card catalog but rather the index volume. Documentation, later information science, was born out of the need to develop better indexing methods for periodical articles.

Let me digress briefly to remind you of the typical pattern of technology adoption. In the first stage, technology replaces manual or traditional methods; activities are performed faster and more effectively. In the second stage, technology fosters new applications and things are done that were never done before. In the third stage technology transforms or changes life-styles and the behavior patterns of people.

Presently we are following these stages in librarianship. We have begun with replacement technologies. Online catalogs and online retrieval systems are essentially stage 1 technology. They do the same things but better. Progression to stage 2 is taking place however, as we adopt Boolean techniques to perform complex search strategies not possible with print resources. The combination of the book catalog with the periodical indexing system for both local and distant material is another stage 2 activity that will soon take place.

In the future the library will probably be a smaller facility which functions as a gateway agency, a node in a comprehensive information network. The intellectual access function will be (and probably already is) infinitely more important the the physical access function. The two aspects may be separated into different organizational units altogether. I won't elaborate on the human behavioral transformations that will occur and are already occurring. There are many journal and popular magazine articles that describe remarkably similar future scenarios showing how people will access and use information in very different ways.

Information resources management, then, is an outgrowth of too constrained a prior framework, the push of technology, the rise of integrated bibliographic networks and utilities, the keyboarding of great quantities of currently published materials so that a substantial store exists in machine-readable form, and lastly, and perhaps more importantly, the emergence of a discipline devoted to the study of information from a theoretic and scientific perspective.

Librarianship has been limited in the past by its heavily pragmatic approach. The scholar librarians of the early development of the profession quickly gave way before the onslaught of immediate and practical concerns. Research in the librarianship aside from a brief flurry in the 30s and 40s when we discovered the social sciences has been fairly limited and pedestrian. Only recently have we reached for sophistication in quantitative research techniques, experimental design and more formal and mathematically based studies.

One might say that we have progressed in the library/information field from humanistic historical studies which gave us analytic and conceptual skills to psychological, sociological, political and economic studies which gave behavioral insight to our user studies and now to scientific studies which bring greater precision and objectivity. Note that with each successive wave of theory we have become more specific and have concentrated on a smaller unit of analysis with greater confidence in our findings. Such is the growth of a discipline!

What I have tried to demonstrate in this portion of my talk is that a broader approach to managing information resources (both physical and intellectual) is necessary. In the past we have accepted two concepts about information: (1) that it is an overhead expense that should be freely available to all sectors of society and (2) that information can be purchased on a one-time basis and stored for subsequent reuse.

Information is now viewed as a commodity that can be bought and sold at the wholesale level and repackaged for sale at the retail level. Thus the idea of an information utility delivering message units for a use-based fee in similar fashion to the way we receive gas and electricity is overtaking the free good concept. Also one-time purchase of an information package for subsequent use is giving way to purchase of information on demand. A corrolary paradigm replacement appears to be occurring in education, albeit more slowly. There is a movement towards design of educational delivery systems intended to teach knowledge and skills at the point of need rather than requiring students to store up

knowledge in their heads for subsequent reuse over a lifetime.

The mission of information resources management is first to integrate the internal information resources - both physical and intellectual - to make them efficient and effective in supporting the work of the organization and second to filter the external knowledge base in order to bring in only that which is relevant and useful at the time and place for it to advance the effectiveness of the work. Information managers, a new kind of specialized personnel, are necessary to plan and coordinate the design and maintenance of appropriate systems and services. An overall information management policy is a necessity. Interactive databases and PC-based information systems linked by a network for all users will be the base technology.

Although I have used the library as a touchstone to elaborate some of the principles of information resources management and the rationale behind this new concept, I hope I have also conveyed the idea that is no longer sufficient to think of the field of librarianship apart from the larger contect of information management. I believe our profession must redefine itself. We can no longer see ourselves solely as librarians. Information is our defining term.

Academia

The academic institution today is a corporate entity with an intellectual mission. It has lagged behind business and industry in using information technologies and looking at its resource problems comprehensively. In the past five years, however, the use of technology to manage the administrative aspects of the university has been growing. There are now online accounting systems, student and alumni data systems, energy management and security systems. University presses and printing offices on campus are making use of electronic ways of typesetting, editing and formatting publications. Mailings to prospective and current students and alumni are computer-processed. Inventories of the physical plant -- the buildings, equipment, furniture -- are online as are purchase requisitions and maintenance contracts.. Comparative statistical compliations are available through EDUNET with software to manipulate the data for analytical purposes. In all this behind the scenes activity the university has moved to stage 1 replacement technology use and is beginning to see the possibilities of stage 2, finding new applications of the technology in place.

Change is much less evident on the academic side. The fast pace of technology change combined with slow response from the academic community has created a growing disparity

between the education provided to students and the expectations and needs of employers. Graduates are unprepared to use tools that are common and everyday in the corporate world for information transfer and handling. Often only students enrolled in technical fields like engineering or computer science are systematically introduced to information technology tools and skills. There is a tremndous need for technologically-literate college graduates who are not majoring in technical subjects.

A technology-based education requires a substantial capital investment. The academy has made substantial progress in finding the funds for transforming the organizational and administrative management of informationbut the management of academic information and knowledge has been neglected. What capital investment there has been in technology to support the academic mission has usually been directed toward the computing center and the scientific fields often at the expense of needed investement in transforming the library. The lack of an online library catalog today means a serious handicap for all faculty and students. Their ability to manage their own information resources wisely is impaired.

User studies have shown us that three traditional barriers stand between the information user and the needed information resources -- (1) geographical distance, (2) time-consuming and frustrating methods of locating information, and (3) the user's need to devise personal control systems to accommodate the tremendous volume of note files and reprint collections. Academic libraries today have the means to remove these barriers. The challenge to the faculty, including the library faculty, is to understand the new paradigm of information services, to plan a managed process for comprehensive information system development and to argue the case for greater investment in essential information technologies.

Clearly the librarian must have a very different kind of education than that currently provided by most library schools. Many of the ARL library directors have been vocal in their criticism of the present content of library school curricula and quite rightly so. We have not incorporated the technology into our schools as we must if we are to survive as an information profession. Academic libraries need people with sophisticated knowledge of the technology so they can take responsibility for planning and purchasing enormously expensive new systems. They need people who will articulate the changes to the academic community as knowledgeable advocates of the economic investment necessary. The library directors must be prepared to accept a new breed of graduates and be prepared to reorganize internally to allow the degree of professional autonomy necessary to accomplish the great changes that must take place.

There is hope for a more problem-based relationship with the researcher clientele in the academic library. Clearly it would be more fruitful than concentration on a particular topic in a static object approach. A more dynamic method is needed. Librarians will have ben to competent to work in these new ways and the library organization must be such that the consultative method becomes the expected mode. There may be a prototype in the online searcher/clientele pre-search interview but this can become too finely focused on topic identification and the techniques of working around the Boolean sledge hammer techniques we now use in searching. A better model may be that of the information counsellor and the independent information broker.

The swing to greater concentration on instruction will continue. It is hoped that the instruction will focus on helping the learner acquire knowledge of the structured array of information tools and the ways of acquiring, organizing and managing a tailored subset for individual purposes. Students must acquire not "library use skills" nor "computer use skills" but rather information/computer literacy to solve their information problems and to code with demands placed on all who live in an information-based society.

Today when the precise retrieval and application of already discovered knowledge is of equal importance to the discovery of new knowledge, it is imperative that research te4ams have one member who can serve as the information intermediary and the information manager for the team. Filtering, selectivity and compression are the order of the day. The librarian will be called upon to find relevant articles in reponse to a query, extract the salient facts and prepare a mini-review. This repackaging and evaluative function will assume greater importance in the future.

The old bifurcation between technical services and user services will continue to exist. In fact I suspect that the technical support function will merge with the academic computing network to provide total system integration for knowledge transfer activities. Similarly the aid centers rapidly developing in computing centers will merge with the public service librarians to provide comprehensive user support service. The larger framework of the information resources management approach is necessary to effect this rational transformation.

Education for Information Management

What kind of a curriculum is needed to support these new functions to enable our graduates to assume their new responsibilities with confidence? In thinking about the

curriculum I find it useful to take a top-down approach and to work from a purposefully simplified conceptual structure. We educators have more often used the reverse procedure, that is, we have added a course here and another there trying desperately to cover the range of knowledge and skills needed by students. The result is a hodge-podge of courses, a crazy-quilt of the old and the new -- courses in information retrieval and online searching in uncomfortable juxtaposition with courses in cataloging and classification and reference. We have a set of one-technology courses that are born of necessity, rise to a climax of popularity and then subside into desuetude. For example, yesterday we taught microforms, cable television, videctext. Today we teach microcomputers, videodiscs and telecommunications.

I wish to return to a simpler framework and propose three boxes as conceptual containers for all the curriculum. This may be a useful way for schools to reorganize their curricula and for students to select a set of courses among the maze of possibilities. My tripartite approach includes: theory, problem-solving and the environment. As the time grows long, I will risk being too brief in outlining the content of these boxes.

First on theory, we need to understand what our field is fundamentally. I have suggested that it is not librarianship but rather information. There seems the beginning of a very broad theoretical framework based in general systems theory in which information is seen as the third essential component for living systems parallel to the matter and energy components studied by other sciences. We need to understand the properties of information and how humans process it. The expansion and elaboration of the old Shannon and Weaver information theoretic concepts are important in the design of appropriate systems and in the development of true knowledge-based expert systems. Each professional needs to understand the theoretical base as well as the shared values and philosophic orientation of the field.

The second element is problem-solving, the chief component of any good professional education. This is the skill-development area. Problem solving involves two aspects: the representation of the problem and the development of solution paths, or search strategies, to take one from the initial state to the desired goal. There are many professionally learned schemas that teach us how to represent particular problems. For example, librarians have learned to represent knowledge in terms of a universal classification scheme. They have learned a structured approach to mapping information problems to reference sources. It is claimed that a chess master may have as many as 10,000 patterns stored in his head. I suspect the same might be said of a good reference librarian, a children's

librarian or an academic library administrator. We use learned patterns as ways of representing problems and reasoning analogously to a solution, although we may never have encountered the particular problem we confront previously.

Problem-solving is the most volatile part of the curriculum as needed skills change rapidly. This area is where the bulk of continuing education demands lie. The task requirements for the future role of the academic librarian must be analyzed so that appropriate problem-solving skills for entry level professionals will be included in the library/information school curricula.

The final component of a good professional education is the study of the environment where practice will take place. I plan to offer a new course next semester entitled "Information Management in Colleges and Universities" which might be seen as a more comprehensive replacement of the old academic libraries course. The course will use a systems framework to examine the totality of information flow within academia and will include both the administrative and the academic information systems. Similarly we now teach an "Information Management in Schools" course which replaces the school libraries course with a broader concept. Within the study of the environment one must include the study of the characteristics of the user population whether they be scholars, technicians, citizens or children.

We know that the goal in education today as it was for Comenius in the 17th century is to find a method of instruction by which teachers teach less and learners learn more. We need to move away from indoctrination and the dependent learner to a decision-oriented adult learning process whereby the student structures his or her own program incorporating knowledge held by faculty and the school's information base in selecting courses and experiences based on his/her own perception of what will be needed to be prepared for a particular position or target environment. One way of selecting courses so they form a balanced array is select a portion that are theoretical and thus long term in nature, a group devoted to developing problem-solving skills needed for entry-level professional positions with the understanding that new skills will have to be continually acquired over one's professional lifetime, and a set that examine the environment and its population.

In conclusion I have tried to make the point that the environment in which libraries function is changing radically and will become more and more different in the future. The integrative concepts from information resources management seem an appropriate framework for redefinition of the library field to the larger world of information. Knowledge of information, its properties and how humans use it, combined

with sophisticated knowledge of powerful information technologies can be applied not orly to professional problems but to our professional educational delivery systems.

I close with a quotation:

> "Nowadays, nothing we learn lasts for the rest of one's life. Our forefathers relied for a whole lifespan on what they learned in their youth at school; we have to learn and relearn every five years, if we are not to be hopelessly out of date."

By the way, the quotation is from a novel written by Goethe in 1809. Is there nothing new under the sun?

APPENDIX C

Report on the Conference on The Intellectual Foundations for Information Professionals: Criteria for New Educational Programs

Emporia, KS
15-18 November 1984
by
Herbert Achleitner

Purpose

The purpose of this conference on the Intellectual Foundations was to examine the following three streams of education for information professionals in order to identify those intellectual foundations which could lead to an integrated educational program:

1. Information Systems Education (including MIS) taught at business schools
2. Information Science and Library Science taught at library schools
3. Information Resource Management Education (including Records and Archives Management).

What is the core of the three streams: What are the intellectual underpinnings of these three information professions, and what is their relationship to information science? What is the proper theoretical base from which these systems draw? These are some of the questions the conference addressed.

* commonalities and differences of the three educational and conceptual streams
* skills and values common to the three fields
* the relationship between theory base and professional core practice within each of the identified systems
* whether core educational programs integrating knowledge, values, and skills can be developed for the information professions.

Commonalities

The conferees recognize that the commonalities in the three streams for information professionals are found at the organizational level. Broadly speaking, all three streams are involved in:

* The management of information

* The design and management of an information system encompassing a data base

* Recognizing the need for accommodating the information needs and behavioral characteristics of people (clients, users and potential users)

* Recognition that information is a social product.

More specifically, the consensus is that information has value, and that the actual value of information is based on current or anticipated uses. A more difficult issue for all three streams is the concept of potential value of information, which is based on unanticipated uses.

The conferees also agree that the most important activity for an information professional from any tradition is the design of information systems and the nature of these systems depends upon the tradition and the use of the information.

Regardless of their source of tradition or history, information professionals are developing similar characteristics. These include:

* Moving away from their source tradition as a basis for their activities
* Adopting a mission-oriented approach to information
* Acquiring and using cross-disciplinary skills
* Using most of their time managing people in an organization, not carrying out professional activities
* Seizing a more strategis role in the enterprise
* Becoming more knowledgeable about the enterprise's business and relating the organization to the business
* Becoming more sensitive about the content and packaging of information for its intended use

It was noted that none of the traditions have effective methods for handling "messy" information (peripheral, informal, verbal, allegatory, pictorial, etc) and that all traditions are growing toward an understanding that the information user cares not about the system which delivers the information he needs, but about quick and accurate information.

There is a sense among the conferees that a convergence is developing amongst the three streams since their focus is on information itself (content, intended use, delivery, etc.). Also, it appears that the management of information requires more pro-active information professionals working with their clients to become more knowledgeable about their needs and desires, the packaging and delivering effective, correct, and relevant information.

Information Resource Management

Because of the Paperwork Reduction Act which has firmly established IRM in the public sector, there is no doubt in conferees' minds that the IRM concept represented a significant and persistant trend, that it involves a panoply of job opportunities in the public sector, and that the educational world has not addressed the training needs inplicit in this trend. There was less specific testimony about the adoption of the IRM concept in the private sector. It is the consensus of the group that the Chief Information Officer, within the private sector, would evolve into a counterpart of the public sector model. Currently, in the evolution of the CIO there is less recognition of the value of text as an information resource than there is in the IRM model. However, there is an increasing recognition of the need for external as well as internal information.

Education

The success of a professional degree program for information professionals will depend upon many elements:

* Avoiding turf battles with neighboring disciplines
* How well can it perform within the existing reward structure
* How sensitive and responsive it is to rapid changes in the marketplace for its products--and how successful its graduates are
* How effectively it can identify and pursue a valid strategic vision for its own future
* How effectively it can retain the best and shed the worst of the tradition of neighboring disciplines
* How well it prepares its graduates to make effective use of the interactivity between theory and practice
* How well it "markets" its programs to the potential information professionals

The dynamics of the conference revolved around the mixing of values and practices of the three streams. The interaction led to not only a broader perspective of the information professions by the participants, but also to the recognition that a convergence of the three streams is currently taking place while the precise evolutionary path that they will follow cannot at this point be discerned, it is on the commonalities that they must build.

APPENDIX D

INFORMATION RESOURCES MANAGEMENT PROGRAM SURVEY

Instructions: Please complete each of the following questions by checking the appropriate answer in the space provided. After completing the questionnaire, return to Dr. Charles R. McClure in the attached, self-addressed, stamped envelope. THANKS FOR YOUR ASSISTANCE.

A. BACKGROUND INFORMATION:

1. Type of institution where employed: (check one only)

( ) Public ( ) Private

2. Status of institution where employed: (check one only)

( ) Junior College
( ) Four-year College, primary emphasis on undergraduate education
( ) University with graduate programs primarily at the masters level
( ) University with Ph D programs in five or more disciplines

3. Which one category BEST describes your administrative responsibilities?

( ) Top Administration: Director or Assistant/Associate Director
( ) Department Head: Supervises at least one other professional
( ) Area or Section Head: Supervises only paraprofessionals
( ) Non-administrative: Does not supervise other library employees

4. Which one category BEST describes your primary area of responsibility?

( ) Administration (Director or Assist/Assoc Director)
( ) Acquisitions
( ) Serials
( ) Circulation/Interlibrary Loan
( ) Cataloging
( ) Government Documents
( ) Reference services
( ) Collection Development
( ) Audio Visuals
( ) Microforms
( ) Automation
( ) Special Collections
( ) Other, please describe _____

5. Which one category BEST describes your education?

( ) BA/BS only
( ) Masters NOT in Library Science only
( ) Masters in Library Science AND subject area
( ) Masters in Library Science and Sixth Year Certificate
( ) Masters in Lib. Sci. only
( ) Doctorate

6. Years of experience in the present library? _____ years

7. Total years of library-related experience? _____ years

8. Sex: _____male _____female

9. Age: _____

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B. PROGRAM TOPICS

Please assess your (1) current level of adequacy and (2) desired level of adequacy on the following topics by circling the appropriate number. "Desired level" is considered to be the level desired either for your current position or to assist you to obtain another position. Please assess these skills in the following manner:

1 = No Competency 2 = Inadequate Competency 3 = Some Competency 4 = High Competency 5 = Exceptional Competency

TOPIC	CURRENT LEVEL	DESIRED LEVEL
Technology		
10. online bibliographic data base searching (DIALOG, BRS, etc.)	1 2 3 4 5	1 2 3 4 5
11. automated circulation systems	1 2 3 4 5	1 2 3 4 5
12. microcomputer applications	1 2 3 4 5	1 2 3 4 5
13. design and evaluation of information storage and retrieval systems	1 2 3 4 5	1 2 3 4 5
14. applications of bibliograhpic utilities (OCLC, RLIN)	1 2 3 4 5	1 2 3 4 5
15. computer programming languages (BASIC, COBOL, etc.)	1 2 3 4 5	1 2 3 4 5
16. evolving information technologies (Optical disks, Cable TV, Fiber Optics, etc.)	1 2 3 4 5	1 2 3 4 5
17. purchase and evaluation of (micro)computer-related software and hardware	1 2 3 4 5	1 2 3 4 5
Research		
18. basic research methods	1 2 3 4 5	1 2 3 4 5
19. collection analysis	1 2 3 4 5	1 2 3 4 5
20. evaluation of user services and programs	1 2 3 4 5	1 2 3 4 5
21. operating computerized statistical packages (SPSS, SAS, etc.)	1 2 3 4 5	1 2 3 4 5
22. writing skills	1 2 3 4 5	1 2 3 4 5
23. cost analysis of library services and activities	1 2 3 4 5	1 2 3 4 5

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Administration and Services

24. document delivery to clientele	1 2 3 4 5	1 2 3 4 5
25. indexing and abstracting	1 2 3 4 5	1 2 3 4 5
26. cooperative resource sharing	1 2 3 4 5	1 2 3 4 5
27. archives and records management	1 2 3 4 5	1 2 3 4 5
28. using information for organizational decision making	1 2 3 4 5	1 2 3 4 5
29. personnel management	1 2 3 4 5	1 2 3 4 5
30. strategic planning	1 2 3 4 5	1 2 3 4 5
31. decision support systems (DSS) or management information systems (MIS)	1 2 3 4 5	1 2 3 4 5
32. marketing library services	1 2 3 4 5	1 2 3 4 5

Issues

33. the impact of technology on access to information	1 2 3 4 5	1 2 3 4 5
34. the role of information management in your institution or organization	1 2 3 4 5	1 2 3 4 5
35. integrating library activities with the larger institution	1 2 3 4 5	1 2 3 4 5

OTHER TOPICS OR ISSUES THAT YOU BELIEVE IMPORTANT:_____

C. ASSESSMENT OF PROGRAM OPPORTUNITIES, SCHEDULING, AND FORMAT

Instructions: The following questions are intended to identify (1) your preferences for formats and scheduling of an advanced program, and (2) your views on factors that might tend to encourage or discourage your participation in such a program.

38. The major benefits that I would receive from completing a 9-12 hour, graduate program related to information resources management would be (check all that apply):

( ) a significant increase in salary
( ) ability to obtain a new position or responsibilities in this org.
( ) personal sense of accomplishment
( ) other benefits? please describe:_____
( ) increased status in my library
( ) better market potential to get a new job outside this org.
( ) nothing

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39. This institution supports my obtaining additional formal education by (check all that apply):

( ) providing sabbaticals
( ) providing "release time" to attend classes
( ) other support?
please describe_____
( ) reimbursements for tuition fees
( ) providing "leaves without pay"
( ) no direct support provided

40. My preference for attending formal classes for a three credit hour course would be (rank from 1 = best to 2 = acceptable to 3 = not acceptable):

( ) once a week, evenings (M-TH)
( ) every two weeks on Saturday for full day
( ) other?
please describe: _____
( ) six day intensive week (M-SAT)
( ) Friday-Saturday, every other week

41. Would you require a scholarship or grant if you wished to attend a 9-12 credit hour program related to information resources management?

_____ yes _____ no

If YES, and assuming the program could be taken in two continuous semesters, what amount would you require?

( ) $250 ( ) $750 ( ) $1,250 ( ) $1,750
( ) $500 ( ) $1,000 ( ) $1,500 ( ) more than $1,750

42. Please rank each of the following factors regarding their importance as to your decision to potentially participate in a formal 9-12 credit-hour program (1 = has great impact on my decision, 2 = has some impact on my decision, and 3 = has no impact on my decision):

_____ distance to classes
_____ class scheduling
_____ potential of the program to improve my salary
_____ institutional support
_____ other factors?
please describe:
_____ content of the program
_____ family and personal commitments
_____ potential of the program to obtain a better position
_____ costs of attending the program
_____ availability of scholarships

---

43. The percentage of time that <u>should be</u> spent on "in-class" activities versus "independent studies" for a 9-12 hour graduate program in information resources management is:

_____% in-class _____ % independent study

44. In general, the likelihood that I would attend <u>ANY</u> graduate program of 9-12 hours related to information resources management is:

( ) wouldn't attend
( ) not very likely
( ) have some interest
( ) have a great deal of interest

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ADDENDUM QUESTIONS FOR DIRECTOR

1. Which of the following can your institution provide to support professional librarians wishing to enroll in formal coursework? (check all that apply)

( ) sabbaticals
( ) leave without pay
( ) re-scheduling of work time
( ) other support?
Please describe:_____

( ) reimbursements for tuition
( ) "release time" to attend class
( ) no direct support is provided

2. Would you actively attempt to provide support, such as release time, for professional librarians wishing to participate in a post-MLS program?

( ) yes
( ) no
( ) it depends on the librarian

3. If a professional librarian completes a 9-12 credit-hour graduate program on a topic such as Information Resources Management, could the librarian expect a salary increase of:

( ) no salary increase
( ) up to $500 per year
( ) $500 - $1000 per year
( ) more than $1000 per year

4. If a professional librarian completes a 30 credit-hour Sixth Year Certificate program, could the librarian expect a salary increase of:

( ) no salary increase
( ) up to $500 per year
( ) $500 - $1000 per year
( ) more than $1000 per year

5. What specific rewards can your library provide to professionals who complete post-MLS programs?

a._____ b._____

c._____ d._____

6. In the planning of a 9-12 credit-hour post-MLS program, what factors should be considered to encourage librarian participation? (rank 1 = essential, 2 = useful, 3 = unimportant)

_____ award scholarships
_____ reduce amount of formal class time
_____ Bring in "big name" speakers
_____ Other Factors?
please describe:_____

_____ convince librarians of the importance of the program
_____ emphasize practical skills
_____ scheduling of classes

Please use the back of this form to add any comments or suggestions regarding the design of a post-MLS program in Information Resources Management. THANKS!

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ERIC Clearinghouse on
Information Resources
Syracuse University
School of Education.
Syracuse, N. Y. 13210
(315) 423-3640

AUTHOR ABSTRACT
(To Accompany Document Submitted to ERIC/IR)

Author: Charles R. McClure

Title: Information Resources Management Skills for Academic Librarians: Final Report

Abstract (up to 200 words):

This report is a summary of activities conducted under a planning grant from the Council on Library Resources for Innovation and Improvement of Basic and Supplementary Education for Academic and Research Libraries, from Fall, 1984 through Spring, 1985. The report provides a review of selected literature related to educational programs for academic librarians broadly related to information resources management, the results of a needs assessment conducted in the state of Oklahoma regarding the appropriateness of a post-MLS certificate program in information resources management, and the discussions that took place at the Fall, 1985 School of Library Science, University of Oklahoma colloquium on the topic of Information resources management. Appendices include papers presented by Evelyn Daniel and Robert Runyon at that colloquium.

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Information About Document
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Paper presented at:

Project Report (Contract Information, if possible) Final report for a planning grant from the Council on Library Resources for Information Resources Managment educ

Journal Article (Complete Citation)--(Some journals do not appear in CIJE)

Other

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